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AT

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## FACULTY

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*Assistant Professor of Botany and Forest Pathology.*

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\* During the present year a permanent Dean and additional members of the technical forestry staff will be appointed.

*College of Forestry*

(COLLEGE OF APPLIED SCIENCE.)

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## ESTABLISHMENT OF A STATE COLLEGE OF FORESTRY AT SYRACUSE UNIVERSITY

During the session of the Legislature of 1911, a bill was passed entitled, "An Act to Establish a State College of Forestry at Syracuse University, and making an Appropriation therefor."

The bill reads in part, as follows:

§ 1. "ESTABLISHMENT; CORPORATE NAME. There is hereby established at Syracuse University a State College of Forestry, which shall be known as The New York State College of Forestry at Syracuse University.

§ 2. OBJECTS AND PURPOSES OF COLLEGE. Such college shall have for its objects and purposes:

*First.* The conduct upon land acquired for such purpose of such experiments in forestry and forestation as the board of trustees deem most advantageous to the interests of the state and the advancement of the science of forestry.

*Second.* The planting, raising, cutting and selling of trees and timber at such times, of such species and quantities and in such manner as the board of trustees deems best, with a view of obtaining and imparting knowledge concerning the scientific management and use of forests, their regulation and administration, and the production, harvesting and reproduction of wood crops and the earning of revenue therefrom.

§ 3. MANAGEMENT AND CONTROL OF COLLEGE. The care, management and control of such college and the property and premises required therefor shall be exercised by a board of twelve trustees. The state forest, fish and game commissioner, the state commissioner of education and the chancellor of Syracuse University, shall be ex-officio members of the board of trustees. Of the remaining nine members of the board of trustees, three shall be appointed by the governor, by and with the advice and consent of the senate, and six by the board of trustees of Syracuse University. The members appointed by the governor and by the board of trustees of Syracuse University shall be divided into three classes, so that the terms of one-third thereof shall expire on June thirtieth, nineteen hundred and twelve, and one-third thereof on the thirtieth day of June of each second year thereafter. Successors to such trustees shall be appointed by the governor and by the board of trustees of Syracuse University for full terms of six years. In case of any vacancy in the office of any appointive trustee his successor shall be appointed for the unexpired term for which he was appointed. The members of the

board of trustees shall serve without compensation, but shall be entitled to their actual necessary expenses incurred in the performance of their duties."

This bill was signed by Governor Dix on the 28th of July, 1911, and became effective immediately thereafter. The board of trustees was appointed and the Governor's appointees confirmed by the Senate about the first of October. The first meeting of the Board was held on October fifth.

#### THE WORK OF THE COLLEGE

By the terms of the act which creates the College of Forestry, the work of this institution covers two important and co-ordinate lines: 1. It is to undertake such operations and investigations in forestry as will throw light upon and help in the solution of the forestry problems which confront the State and the people of New York. 2. It is to be an institution for instruction in forestry.

#### INVESTIGATION AND DEMONSTRATION

In the accomplishment of its first object, the College of Forestry will be required to acquire lands and make such improvements and constructions as are necessary to prosecute the work of investigation and practical demonstration of forestry operations. Manifestly such facilities will also be of great value as a resource in the work of instruction.

#### PLAN AND SCOPE OF INSTRUCTION

Instruction in the field of forestry proper will be made to comprise the following:

(1) Lectures and class-room instruction in historical and economic aspects of forestry for all students desiring a knowledge of the meaning of forestry.

(2) More extended instruction along these lines for those who desire to prepare themselves to give instruction in forestry in the public schools of the State.

(3) Instruction and advice by means of public lectures at various points in the State and by published bulletins and the aid of expert foresters on the ground, for the benefit of owners of hill lands, of farm woodlots and of forest lands to enable such owners to handle the problem of applying scientific forest management to their various properties.

(4) The training of men in such branches of forestry as will fit them to fill subordinate positions in state and national service — forest ranger, fire guard, patrol, etc., or in private employ such as woods foreman in practical lumbering operations.



(5) The training of professional foresters for positions of large responsibility in the public service or as forest experts for private concerns.

#### ADMINISTRATION

For administrative purposes the College of Forestry will constitute one of the several colleges (Liberal Arts, Fine Arts, Medicine, Law, Applied Science and Teachers) operating under the management of the Syracuse University Corporation, but as provided by legislative enactment, a special board of trustees administers, through the Chancellor, the affairs of the College of Forestry. The faculty of the College of Forestry will have as its nucleus a staff of professional foresters who will give all instruction offered in technical forestry. For instruction in subjects fundamental to or correlated with forestry, members of the faculties of other colleges are chosen as members of the forestry faculty, but instruction in subjects other than technical forestry will be given in the several colleges and departments devoted to the respective subjects. There will thus be a close relation between the College of Forestry and other colleges of the University which will have the advantage for forestry students of giving them a university environment to work in which will be calculated to broaden their outlook.

#### FACILITIES FOR INSTRUCTION

For the present, the College of Forestry will be housed in the Lyman Hall of Natural History where lecture room and laboratory equipment are being provided which will comprise everything necessary in the work of indoor instruction in forestry. Also the necessary instruments for field work in forest surveying, mensuration, etc. This equipment will include also library facilities, and abundant illustrative specimens of woods, charts, lantern slides, photographs, etc.

#### FORESTRY NURSERY PRACTICE

For the study of those aspects of silviculture which embrace the production of trees from seed, there will be furnished close at hand ample greenhouse facilities, out-door seed beds and grounds for transplanted seedlings as well as for different classes of permanent plantations.

#### GENERAL FIELD WORK IN FORESTRY

Steps are being taken to provide by purchase proper sites for the practice of the larger field operations embraced in silviculture, forest survey and mapping, forest mensuration and forest management. Forest lands

in the Adirondack region to the extent of 2000 acres have already been presented to the University for the use of the College of Forestry.

The location of the College of Forestry is especially favorable in affording the students easy access to all the diverse conditions of the State as respects forestry operations and in particular in its nearness to the Adirondack forests, than which there is no more strategic center as respects the solving of forestry problems anywhere. In this region, the forestry operations of the State Conservation Commission are available for study by forestry students, and already private holders of large forest tracts have signified a willingness to open their forest lands to the College of Forestry for field practice for its students.

#### REQUIREMENTS FOR ADMISSION

Students entering a regular course leading to a degree must offer fifteen units of preparatory work of high school grade. A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. Two hours of laboratory work count as one hour of recitation. See requirements for admission to the Science Course, page 67 of general catalogue.

The fifteen units must include the following:

English (4 years of high school work).....	3 units
Algebra, Elementary and Intermediate.....	1½ units
Plane Geometry.....	1 unit
German or French or Spanish (Elementary and Intermediate, 3 years).....	3 units
or	
Elementary French or German or Spanish or Italian (2 years) and Latin (2 years).....	4 units
Physical Geography or Geology, Physics, Chemistry, Botany, General Biology or Zoology (one year each). (Note books in science required.)	2 units
History: Ancient or Medieval and Modern or English, or American and Civics (one unit of each or of any two).....	1 unit
Freehand Drawing.....	1 unit

and elective units from above subjects not already offered or in Greek and advanced mathematics to make total 15 units.

Entrance examinations will be held at the University September 13-17, 1912.

No candidate is eligible for admission to regular courses if delinquent in more entrance work than can be done in one-half year in the preparatory school. Deficiencies must be worked off during the freshman year.

Diplomas issued by the Regents are accepted, also the certificates of approved high schools made on blanks furnished by the registrar.

Admission to the two-year ranger course is not rigidly fixed in units as above, but young men under twenty years of age are advised not to apply for entrance before finishing their high school course. Candidates over eighteen years of age who have had practical experience in the woods in practical lumbering or as inspectors, patrols or guards, will not be required to present entrance credentials for the two-year course as specified above.

#### FEES AND EXPENSES

**MATRICULATION.** Every student on first entering the University is required to pay a matriculation fee of \$5.00. This fee is paid but once and is not returnable.

**TUITION.** As specified in the Act under which the College is established, tuition is free in The New York State College of Forestry to all students who have resided in the State one year prior to matriculation.

**INCIDENTALS.** A fee of \$10.00 a semester is charged to cover cost of lighting, heating, use of library and gymnasium, etc. Payment of this fee entitles the student also to medical attention and hospital facilities free of charge for a limited time in case of serious illness or accident.

**LABORATORY FEES.** In laboratory courses a fee is charged each student in the course to cover the cost of materials consumed. These fees range from one dollar to five dollars for courses specified for forestry students. (See catalogue, p. 53.)

**GRADUATION AND DIPLOMA.** The fee for diploma and graduation is \$10.00. For the certificate given to students completing the *Ranger's course*, \$10.00.

**GENERAL EXPENSES.** Room rent in Sims Hall, Dormitory for men, varies from \$66 to \$84 a year, including heat and light, according to location of rooms. All rooms are furnished with necessary furniture.

Table board at Sims Hall is \$3.50 per week. There is also a *la carte* service for any who may not wish regular board.

For circular of information and diagrams of dormitories address the Treasurer of the University.

The cost of living in Syracuse is comparatively low. While the total expenses of students vary according to their habits, tastes and means, a fair estimate of the yearly expenses is from \$325 to \$500. The following figures denoting the yearly expenses of several students, selected at ran-

dom, including tuition, board and room, books, stationery, laundry and supplies: One student kept his total expenses down to \$275; another to \$290, two others to \$300; three to \$325; several others from \$350 to \$450. By the formation of clubs, students are able to reduce their expenses for room and board to \$4.25 a week.

Students who need to increase their income while in college can frequently find employment of various kinds in the city. It is seldom that deserving and capable students cannot find the means of earning money in occupations not inconsistent with their college duties.

Apply to Mr. Elgin Sherk, Secretary Y. M. C. A., Syracuse University, for information about board or rooms and about employment.

### COURSES IN FORESTRY

Three groups of courses are offered in Forestry:

1. A four-year course leading to the degree of Bachelor of Science in Forestry.
2. A five-year course leading to the degree of Master of Forestry. This course will require two years of graduate work for graduates of Syracuse University or other institutions of similar rank, whose undergraduate work has not been elected with special reference to the study of technical forestry.
3. A short special course covering two years of study and designated as the Ranger's Course. This course does not lead to a degree, but students who complete it will be given a certificate indicating the scope of their training and the proficiency attained.

### THE FOUR-YEAR COURSE LEADING TO THE DEGREE OF BACHELOR OF SCIENCE IN FORESTRY

This is to be regarded as a general college course in which the student takes forestry for his major subject, understanding that in so doing he falls short of the measure of special training required of candidates for a professional foresters degree. Those students who desire a somewhat intimate knowledge of various branches of forestry for the general satisfaction which such knowledge gives, or for the use they may make of it in practical ways; those who desire to prepare themselves to teach certain aspects of forestry in public schools; those who expect to go into landscape engineering or into city forestry engineering and finally those students who wish after their college course to enter some subordinate position in lumbering or the manufacturing of forest products or subordinate positions in the state or national service, will find this course a good preparation for their work. Such students will not, however, be entitled to the

designation of professional foresters merely upon the completion of the four-year course. Their courses will, however, have been so chosen that immediately upon graduation or after one year or more of practical field experience they may enter upon the year of graduate work as candidates for the professional degree of Master of Forestry.

#### PROGRAM OF STUDY

The four-year course comprises essentially the subjects embraced in the first four years of the professional course (see below), but the elective subjects in the third and fourth years will be limited to courses of special application in forestry.

#### THE FIVE-YEAR PROFESSIONAL COURSE LEADING TO THE DEGREE OF MASTER OF FORESTRY

This course is designed to prepare professional foresters for the higher positions of greater opportunity and responsibility in state service, in the national Forest Service and for the position of expert forester for private concerns. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man must of necessity build his professional training upon a foundation of general culture. It is the unanimous opinion of the leaders in forestry education and in the development of forest policy in this country that men who expect to follow the profession of forestry act unwisely if they try to make a short-cut by eliminating the foundation training. The larger opportunities awaiting well trained foresters fully justify them in devoting the full measure of time advised for preparation.

#### PROGRAM OF STUDIES FOR THE PROFESSIONAL COURSE

*Note. This is a tentative program which may be subject to minor changes in the order in which subjects are pursued and in the time given to them.*

#### FIRST YEAR

<i>First Semester</i>		<i>Second Semester</i>	
English I.....	3 hrs.	English I.....	3 hrs.
Mathematics.....	4 "	Mathematics.....	4 "
German or French.....	3 "	German or French.....	3 "
Chemistry I.....	3 "	Chemistry I.....	3 "
Botany X (a).....	3 "	Forest Zoology I.....	3 "



## SECOND YEAR

<i>First Semester</i>		<i>Second Semester</i>	
German or French.....	3 hrs.	German or French.....	3 hrs.
Geology I or II (a).....	3 "	Geology I or II(a).....	3 "
Physics I.....	3 "	Physics I.....	3 "
Botany XI.....	3 "	Botany XI.....	3 "
Mechanical Drawing D(X)...	2 "	Topographic Drawing D(VI)	2 "
Surveying GI(a), GI(b).....	4 "	Surveying GII(a), GII(b)...	4 "

## THIRD YEAR

Mineralogy II.....	3 hrs.	Mineralogy II and Lithology.	3 hrs.
Plant Anatomy (Bot. XII)...	3 "	Plant Physiology (Bot. XIII)	3 "
Industrial History (Economics I).....	3 "	Principles of Economics (Ec. II).....	3 "
Forestry I.....	2 "	Forestry I.....	2 "
Dendrology (For. II).....	3 "	Dendrology (For. II).....	3 "
Elective.....	3 or 4 "	Elective.....	3 or 4 "

Students are advised to elect Elementary Organic Chemistry or Geology V (d) (soils) or VI or VIII or Analytical Geometry and Calculus.

Field work in Dendrology during summer vacation.

## FOURTH YEAR

<i>First Semester</i>		<i>Second Semester</i>	
Silviculture [For. III (a)]....	4 hrs.	Silviculture [For. III(b)]....	4 hrs.
Forest Mensuration (For. IV)	4 "	Forest Mensuration.....	4 "
Forest Entomology.....	4 "	Forest Entomology.....	2 "
Forest Zoology (Fish and Game).....	3 "	Diseases of Forest Trees....	4 "
*Elective.....	3 "	Elective.....	3 or 4 "

Summer Field Work in Forest Mensuration, Surveying and Mapping between fourth and fifth years.

\* Certain special courses in *Construction Engineering* and in *Prime Movers and Transmission Machinery* will be open to election in the third or fourth year.

## FIFTH YEAR

*First Semester**Second Semester*

Silviculture [For. III(c)].....	4 hrs.	Silviculture.....	4 hrs.
Forest Management (For. V)	4 "	Forest Management.....	4 "
Forest Utilization (For. VI)	4 "	Wood Technology (For. VII)	4 "
Forest Law.....	2 "	Forest Law.....	2 "
Special Assignments.....	3 "	Seminar in Forestry.....	2 "

## SPECIAL SHORT COURSE OR RANGER'S COURSE

The so-called *Ranger's Course* will comprise a program of study in forestry and closely related subjects covering a period of two years and having for its object the training of men to fill certain subordinate positions in the public service such as forest ranger, guard, etc., or for employment in practical lumbering operations or branches of work incident thereto by private concerns. Young men who have already had some experience in lumbering operations or who are well versed in woodcraft, will find this course a material help to them in preparation for the more expert quality of service which is coming to be demanded by modern methods of handling timber holdings, as well as by the state and national forest service. Applicants who are lacking in practical woods experience will be required to offer the equivalent of a high school education for admission to this course. Practical field work in silviculture, forest surveying, estimating, and mapping, forest protection, methods of lumbering, etc., will take precedence over class room work in this course, but the theoretical and practical instruction will go hand in hand.

## PROGRAM OF STUDIES

(Schedule of hours and other details to be arranged)

*First Year*

**SILVICULTURE.** The study of the forest and its environment; factors which influence the stand and the growth of the forest and of individual trees; forests in relation to soil formation and protection and to water supply.

**DENDROLOGY.** Study of commercially or otherwise important trees of the United States and of New York State in particular. Practice in identification of trees both in the summer and the winter condition.

**SURVEYING AND MAPPING.** The use of surveying instruments, field practice in surveying, practical application of surveying to forest operations, running land lines, field mapping of forest tracts, etc.

**BOTANY.** Structure of seeds and seedlings and of the mature plant. Germination, growth, nutrition and reproduction (especially of the tree)

and how these vital processes are influenced by environmental factors such as temperature, light, soil structure, animals, etc. Identification of field and forest plants.

**GEOLOGY.** General study of physiography, physiographic history and conditions in New York State, origin and characteristics of soils, identification of some of the common rocks and minerals.

**ZOOLOGY.** The fish and game of New York; study of the feeding and breeding habits and of methods of propagation and protection.

**FORESTRY HISTORY.** History of forestry in the United States and especially in New York State. The national forestry administration, forest administration and policy in New York State.

**ELECTIVE COURSES.** Election of an additional course or courses may be made according to the capacity of the individual student; e. g., elementary physics or chemistry or mathematics (trigonometry being especially needed in surveying), mechanical drawing, etc.

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#### SUMMER FIELD WORK

Students in the short course will be expected to devote the summer vacation between the first and second years to practical field work in the forest, either in private employment or in field practice conducted by the College of Forestry. Details as to this are yet to be arranged.

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#### *Second Year*

**SILVICULTURE.** Reproduction and care of the forest. The forest nursery; collecting, storing and planting seed and care of seedlings. Transplanting, renewal or improvement of forests by planting; systems of silvicultural management; relation of silviculture to methods of lumbering.

**FOREST MENSURATION AND MAPPING.** Estimating forest stands and the volume of individual trees. Scaling and grading. In field work the class will undertake the surveying and mapping of a forest tract and the preparation of a report showing estimates of the standing timber.

**FOREST UTILIZATION.** Lumbering and manufacturing methods, forest products, structure and uses of wood, wood preservation.

**FOREST PATHOLOGY.** Diseases of forest trees, identification of forest fungi, especially those injurious to trees or wood. Remedial or preventive treatment.

**FOREST ENTOMOLOGY.** Special study of the habits and life history of insects injurious to forest and shade trees. Methods of prevention and treatment.



FOREST LAW. Instruction here will cover briefly law relating to property and the interpretation of forest laws in relation to national and state forestry administration.

## DESCRIPTION OF COURSES

### I. Technical Forestry.

*Note.*—The following description of courses and their values in semester hours is tentative. It will be the object of the management of the College to develop a standard professional curriculum in harmony with present day needs in American Forestry Education.

I. HISTORICAL AND ECONOMIC ASPECTS OF FORESTRY. *Two hours through the year.* An introduction to the subject designed to present the objects and scope of forestry, a brief history of European forestry, the history of forestry in the United States and the relation of forestry to economic conditions in this country. Open to all students above the freshman year.

II. DENDROLOGY. *Four hours both semesters.* A study of the economically important trees of North America as to their botanical characters, distribution, classification and commercial value and uses. Field studies of local species of trees, and practice in identification by the wood characters, and by structures present in both winter and summer conditions.

### III. SILVICULTURE

(a) THE FOREST AND ITS ENVIRONMENT. *Four hours first semester.* Effect of environmental factors—light, soils, rainfall, etc.—upon the composition and development of the forest and upon the growth of individual trees. Relation of forests to soil formation and water supply. Silvicultural characters of different species of trees. The life history of a forest.

(b) FOREST REPRODUCTION. *Four hours second semester.* The natural reproduction of forests. Conditions favoring or retarding natural reproduction. The seed crop of different species. Artificial reproduction of forests. Nursery practice in the production of trees from seeds and in transplanting and the care of seed beds and plantations.

(c) SILVICULTURAL CARE OF THE FOREST. *Four hours, both semesters.* This course deals with the applications of the art of the silviculturist in promoting the maximum growth and yield of a valuable wood crop. Different systems of silvicultural management are discussed. Forest protection, especially as relates to forest fires, is considered here. For other aspects of forest protection see under *Forest Entomology* and *Fungous Diseases of Forest Trees*.

IV. FOREST MENSURATION. *Four hours, both semesters.* In this course, in addition to lecture and text book work, the student is to be given extended field practice in measuring the volume of felled and standing trees and in estimating and mapping stands of timber. Stem analyses of felled trees will be made to determine the rate of increase in height, diameter and volume of representative trees in a stand. Estimating the rate of volume increase in individual standing trees and of forest stands.

V. FOREST MANAGEMENT. *Four hours, both semesters.* The consideration of factors of finance and economic conditions which enter into the practice of forest management looking to a permanent yield of the wood crop. Students will be given practice in the gathering of data and the preparation of working plans for forest tracts under different conditions.

VI. FOREST UTILIZATION. *Four hours, first semester.* Lumbering, manufacturing and marketing the forest crop. Relation of methods of lumbering to the maintenance of a continuously productive forest. Study, in the field, of lumbering and manufacturing operations. The utilization of forest by-products.

VII. WOOD TECHNOLOGY. *Four hours, second semester.* The microscopical characters of the wood of useful forest trees. Relation of the physical and chemical properties of wood to its use in construction, etc. Seasoning and preservative treatment of woods and the relation of these processes to their strength and durability.

VII. SPECIAL ASSIGNMENTS. *Three hours, first semester.* During the year of graduate work individual students or groups of students will be assigned special problems in connection with some branch of forestry which will be in the nature of a thesis requiring a certain amount of original work.

IX. SEMINAR. *Two hours, second semester.* Reports and discussions upon forest policy, forest administration and special problems confronting the forester in the course of his professional duties.

X. FOREST LAW. *Two hours, both semesters.* The object of this course will be to gain a knowledge of Federal and State laws relating to forests and forest policy and of property law and the law of contracts in those aspects likely to be met with especially in the forest service of the State or Nation.

## II. SPECIAL COURSES

XI. FARM FORESTRY. *Three hours, one semester.* Silvicultural care and management of the farm woodlot. Planting and care of trees. Problems of afforestation and timber production upon hill lands. Relation of forest growth on hill lands to soil protection and water supply. Utilization of waste lands for the production of wood for local uses. Open to all upper class students of the University.

XII. THE CARE OF TREES. Choosing, planting and care of shade and ornamental trees for city streets and parks. Protection of trees from fungous diseases and insect pests. Tree surgery. Administrative problems connected with the regulation of tree growth in city streets, parks and on private grounds.

Open to all upper class students of the University.

### \*III. COLLATERAL COURSES PRESCRIBED OR ELECTIVE FOR FORESTRY STUDENTS

#### ECONOMICS

I. 3. Industrial History. This course is introductory to course II, and is designed to present a survey of the industrial development of England and the United States. The leading facts of economic progress are outlined, and, incidentally, their relations to political and social conditions shown. Text-books and lectures. I. T. Th. S., 8.50, room 301.

II. 3. Principles of Economics. Course II, is an elementary study of general principles and problems. It is intended to give a brief but scientific explanation of the facts of industrial life, including those involved in the production, exchange, distribution and consumption of goods. The aim is to inculcate accepted doctrine, and to give to students who may pursue the subject no further a good general knowledge of Economics. Text-books, readings and lectures. II. T. Th. S., 8.50, room 301.

#### FOREST ZOOLOGY

I. 3. Introductory Zoology. II. This course will include a consideration of the fundamental laws of animal life as illustrated in the structure and physiology of the frog, insect, protozoan, etc.

This course is exclusively for forestry students.

II. 3. Fish and Game. I. While this course will be devoted primarily to a study of the more common fish and game, it will also review the animals usually found in forests, such as amphibians, snakes, etc. The question of geographical distribution, propagation, life history and protection of some of the more important game species will be taken up.

#### BOTANY

X (a). 3. ANATOMY, MORPHOLOGY, PHYSIOLOGY AND ECOLOGY OF HIGHER PLANTS. I. The development of a typical plant is followed from the seed through the period of germination and becoming established to

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\* Description of general courses prescribed in the forestry curriculum may be found in the general catalogue of the University.

maturation, flowering and fruiting. The organs and tissues of the plant are studied from the standpoint of adaptation of structure to function, and in general the adaptation of the plant to its environment is emphasized.

XI. 3. GENERAL MORPHOLOGY AND PHYLOGENY. The natural history of plant groups from algae to seed plants. Special emphasis is given to the life history, the geographical distribution and the genetic relationships of the forms studied and to their occurrence in the local flora. F., 12; Th. F., 2-4 p. m.

Prerequisite: Botany X. (a) and Forest Zoology I.

XII. 3. *Plant Anatomy*. I. The tissues of plants considered especially from the standpoint of function. Methods in plant histology, including the preparation of a series of microscopical slides for the study of plant tissues. T. Th., 8; W., 2-4 p. m. and other hours by appointment.

Prerequisite: Botany XI.

XIII. 3. PLANT PHYSIOLOGY. II. Lectures, conferences and experiments on the physiology of nutrition, growth, reproduction and the responsive behavior of plant organs to light, gravity, water and other factors of their environment. T. Th., 8; W., 2-4 p. m. and other hours by appointment.

Prerequisite: Botany XII.

XVI. 3. TAXONOMY. Lectures on the genetic relationships, geographical distribution and economic uses of the families of flowering plants. Field work in studies of the local flora, and in collecting, identifying and preparing museum specimens of native plants. The geographic ecology of the vegetation of the Syracuse region will be a feature of the field work in this course. M., 8.50 M. T., 2-4.

Prerequisite: Botany X.

Note. In their junior or senior year forestry students may elect one hour or more of field practice in forest botany involving especially the identification of forest plants.

XXX. (b). 4. DISEASES OF FOREST TREES. II. Lectures and laboratory work upon pathological conditions in trees with special reference to the identification of fungi which cause disease in trees or the decay of timber. Attention will be given to the effect of fungi upon wood structure and to the effect of wood preservatives upon fungi.

## GEOLOGY

I. 3. PHYSICAL GEOGRAPHY. A study of the surface features of the earth and their relation to human life and industries. Lectures and recitations, T. Th., 8.50; laboratory and field work, T. or W., 2 p. m.

II. (a). 3. **GENERAL GEOLOGY.** Dynamical, structural and historical geology. Lectures and recitations. T. Th., 12; laboratory, Th. or F., 2 p. m. Elective for all classes but should be preceded by course I. or its equivalent. May be taken by permission with two hours' credit by omitting the laboratory.

Vd. 3. **SOILS AND HYDROLOGY.** Origin, deposition, texture and basis of fertility of soils. The soils of New York State. Movement of water in soils. Drainage and irrigation. Relation of soil texture, etc., to moisture. Effect of tillage upon physical properties and fertility of soils.

VI. 2 or 3. **PHYSIOGRAPHY OF THE UNITED STATES.** Lectures on the physiographic regions of the United States and the effect of the geographic features on the distribution and occupations of the population.

Prerequisite: Geology I.

#### MINERALOGY.

I. 2. **DESCRIPTIVE MINERALOGY.** An elementary course in the study of minerals and rocks without the aid of the blowpipe or chemical reagents. Open to students who have not had chemistry, or those who expect to teach natural sciences in the secondary schools. Methods in the preparation of museum material will constitute a part of the course. W., 11; F., 2 p. m.

II. 3. **CHEMICAL MINERALOGY.** A systematic course in the detection of common and economic minerals by their physical properties, blowpipe reactions and confirmatory chemical tests.

Prerequisite: Chemistry I. T., 10; Th., 2-5 p. m.

#### DRAWING

D. X. 2. **MECHANICAL DRAWING.** First year. Drawing instruments and their use, technical practice; projection, orthographic, isometric, and oblique; intersections and developments; scale drawing; technical illustrations, dimensions, notes, etc. I.

D. VI. 2. **TOPOGRAPHICAL DRAWING.** Second year. Stretching, mounting and splicing paper. Drawing with ink; character, sizes and distribution and conventional tints and symbols. Conventional treatment for surfaces and sections. II. Required (D. IV.).

#### SURVEYING

G. I. (a). 3. **COMPASS SURVEYING THEORY.** Second year. Use of chain, tape and rods; use and adjustments of the compass; general problems in surveying; calculation of area; supplying omissions; parting off land; determination of magnetic declination, etc. I.

Required. (Math. I.) (D. II.)

G. I. (b). 4. COMPASS SURVEYING PRACTICE. Second year. Compass survey and map. I. Required. (Math. I.) (D. II.)

G. II. (a). 3. GENERAL THEORY OF SURVEYING. Second year. Use and adjustments of the transit, level and other field and office instruments, including slide rule, planimeter, aneroid barometer, and level trier. Theory of topographic, hydrographic and mining surveying, with stadia and plane table methods. The U. S. government surveys and general resurveys. II. Required. [G. I. (a)].

G. II. (b) 4. GENERAL PRACTICE OF SURVEYING. Second year. Field and laboratory practice with transit, level, barometer, slide rule, planimeter, and level trier. Adjustments of instruments. Topographical survey using stadia, plane table, and hand level methods. Topographical map. II. Required. [G. I. (b)].



## CALENDAR

1912

- Jan. 29. *Monday*—Second semester begins a. m.
- Feb. 4. *Sunday*—Day of prayer for Colleges.
22. *Thursday*—Holiday.
- April 3. *Wednesday*—Easter vacation begins, p. m.
11. *Thursday*—Easter vacation ends a. m.
- May 27. *Monday-Friday* (June 7)—Final examinations.
- June 9. *Sunday*—Baccalaureate Sermon, Gymnasium, 10:30 a. m.
- 10-13. *Monday-Thursday*—Entrance examinations beginning daily at 9 a. m.
10. *Monday*—Class day exercises 2:30 p. m.
11. *Tuesday*—June pageant 4 p. m.
12. *Wednesday*—Commencement 10 a. m.
12. *Wednesday*—Chancellor's Levee, 8 p. m.
13. *Thursday*—Summer vacation begins.
- July 8. *Monday-Friday* (Aug. 16)—Summer school.
- Sept. 13-17. *Friday-Tuesday*—Entrance and Supplementary examinations beginning daily at 9 a. m.
17. *Tuesday*—First semester begins. Students assemble in John Crouse College Hall, 9:30 a. m.
- Nov. 28. *Thursday*—Holiday.
- Dec. 21. *Saturday*—Holiday vacation begins p. m.

1913

- Jan. 6. *Monday*—Holiday vacation ends a. m.
14. *Tuesday*—Midyear examinations begin.
24. *Friday*—First semester ends, p. m.
27. *Monday*—Second semester begins, a. m.
- Feb. 22. *Saturday*—Holiday
- Mar. 19. *Wednesday*—Easter vacation begins, p. m.
27. *Thursday*—Easter vacation ends, a. m.
- May 23. *Friday-Wednesday* (June 4)—Final examinations.
- June 8. *Sunday*—Baccalaureate sermon.
- 9-12. *Monday-Thursday*—Entrance examinations beginning daily at 9 a. m.
11. *Wednesday*—Commencement.
12. *Thursday*—Summer vacation begins.
- July 7. *Monday-Friday* (Aug. 15)—Summer school.

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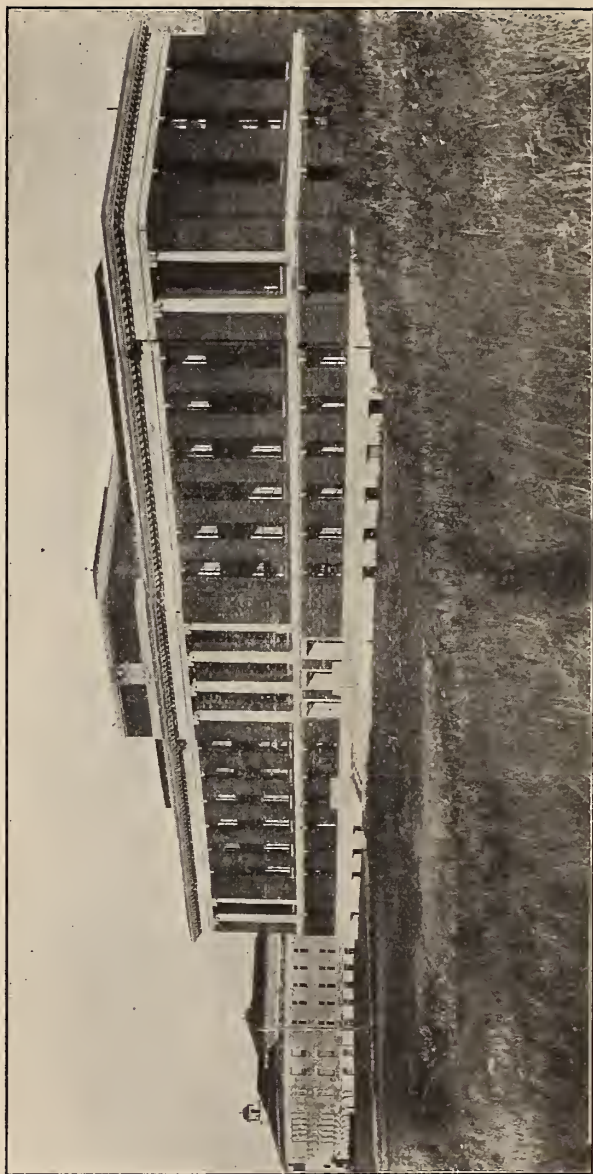
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THE NEW YORK STATE COLLEGE OF FORESTRY AT  
SYRACUSE UNIVERSITY, SYRACUSE, N. Y.

# CIRCULAR No. 25

OF

## The New York State College of Forestry

AT

SYRACUSE UNIVERSITY

# Announcement of Courses



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*Dean of the College; Professor of Silviculture*

(On leave of absence)

FREDERICK FRANKLIN MOON, B.A., 1901 (Amherst);

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*Professor of Forest Engineering; Acting Dean*

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*Professor of Forest Entomology*

EDWARD F. MCCARTHY, B.S., 1911; M.S.F., 1916 (Univ.  
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*Professor of Forest Utilization*

NELSON COURTLANDT BROWN, B.A., 1906 (Yale);  
1908 (Yale)

*Professor of Forest Utilization*

(On leave of absence)

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M.F., 1905 (Yale)

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SEWARD D. SMITH, A.B., 1907; M.S.F., 1909 (Univ. of Michigan)

*Director of New York State Ranger School*

JOHN WALLACE STEPHEN, B.A., 1907; M.S.F., 1909, (Univ. of  
Michigan); M.Pd., 1915 (Michigan Normal College),

*Professor of Silviculture*

CHARLES CHRISTOPHER ADAMS, B.S., 1895 (Illinois Wesleyan);

M.S., 1898 (Harvard); Ph.D., 1908 (Chicago),

*Professor of Forest Zoology*

HENRY R. FRANCIS, B.S., 1910 (Massachusetts Agricultural Col.),  
*Professor of Landscape Extension*

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*Professor of Forest Extension*

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*Professor of Dendrology*

SOLOMON F. ACREE, B.S., 1896; M.S. 1897 (University of Texas);  
 Ph.D., 1902 (University of Chicago); F.C.S.  
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ROBERT CRAIG, Jr., M.S.F., 1910 (Michigan)  
*Professor of Forestry at New York State Ranger School*

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 1909 (Yale),  
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 (On leave of absence)

LAURIE D. COX, A.B., 1903 (Arcadia College); S.B. in Landscape  
 Architecture, 1908 (Harvard),  
*Assistant Professor of Landscape Engineering*

HOWARD BLAINE WAHA, B.S., 1909 (Pennsylvania State College),  
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HARRY HARRINGTON TRYON, A.B., 1912; M.F., 1913 (Harvard),  
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 (On leave of absence)

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 1908-1909 (Yale Forest School),  
*Assistant Professor of Forest Extension*

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 Ph.D., 1916 (University of Wisconsin).  
*Assistant Professor of Dendrological Chemistry*  
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 1914 (Ohio State University),  
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CARL CHESWELL FORSAITH, A.B., 1913 (Dartmouth); A.M.,  
 1914; Ph.D., 1917 (Harvard)  
*Instructor in Wood Technology*

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*Instructor in Forest Engineering*

EDGAR C. PEDDIE, B.S., 1917 (New York State College of Forestry),  
*Instructor in Landscape Engineering*

HIRAM LEROY HENDERSON, B.S., 1915 (University of Michigan),  
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MERLE R. MEACHAM, B.S., 1913 (Hiram College); B.S. in Ch.E.,  
1914; Ch.E., 1916 (Purdue University),  
*Research Assistant in Dendrological Chemistry (Fuller Fund)*

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University),  
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EDWIN N. HOPSON, Jr., A.B., 1917 (New York University),  
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ALVIN G. SMITH, B.S., 1915 (New York State College of Forestry),  
*Field Assistant in Forest Investigations*

WILFORD E. SANDERSON, B.S., 1917 (New York State College  
of Forestry),  
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DON M. BENEDICT, B.S., 1917 (University of Michigan),  
*Laboratory Assistant in Botany*

ALFRED HUBERT WILLIAM POVAH, A.B., 1912; Ph.D., 1916  
(University of Michigan),  
*Special Lecturer in Forest Mycology*

C. F. CURTIS RILEY, A.B., 1901 (Doane College); B.S., 1905  
(Univ. of Michigan); A.M., 1911 (Doane College); M.S., 1913  
(University of Illinois),  
*Special Lecturer in Animal Behavior*

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# NEW YORK STATE COLLEGE OF FORESTRY

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The act which created The New York State College of Forestry at Syracuse University obligates the College to carry on two important and co-ordinate lines of work; First it is to undertake such special research and state-wide investigations in Forestry as will throw light upon and help in the solution of Forest problems which are now confronting the State and the people of New York; second it is the Institution for educational work in Forestry in the State.

## THE PROFESSION OF FORESTRY

The first school of forestry in this country was established in 1898. The course of training at first was general in character and the silviculturist—the man who produced the forest tree crop, was the finished product.

With the rapid development of the National Forest policy, the expanding Forest Service demanded silvicultural executives, technically trained men who could supervise timber sales, handle the office routine of free use, grazing permits, etc. The Forest Service being at that time practically the sole employer of technical foresters in this country, its needs largely molded the educational policy of the forest schools. Owing to the heavy demand for men with forestry training, new schools were established and forestry courses, really scarcely more than synoptic in their scope, were given at many agricultural colleges. The training in all followed the same line—silviculture—the art of timber production, forming the bulk of the curriculum.

After a few years the demand for silviculturists lessened, the Forest Service having largely filled its quota. The schools, however, continued to turn out the same kind of foresters and as a consequence, for a time the supply exceeded the demand. The case was similar to the situation which would obtain, were every engineering school in the country to turn out nothing except Civil Engineers. An over-supply would be created, while mining, electrical, chemical engineers, etc., could not be obtained.

Of recent years, foresters and economists have experienced a new vision. While the growing of the tree crop is naturally fundamental, the permanent prosperity of the country at large and of the manufacturers dependable upon the forest for their raw materials, depends also upon the efficient and economical utilization and distribution of the products of the forest. Indeed, in some portions of the country

where heavy stocks of timber are now found, questions of forest finance, wood utilization and the economical merchandizing of the finished products are at present paramount to crop production.

Then, too, other ways in which the forests may be utilized have come more and more to be recognized as legitimate phases of forestry. In addition to the function of producing timber crops, the public is using the forests to an increasing degree as places of rest and recreation, for hunting and fishing, and as a means of increased food production from grazing animals, fish and game. In order that they may produce to their maximum, the woodlands require the care of the trained forester who in addition to his knowledge of silviculture, also is thoroughly conversant with methods of preventing and controlling injurious insects and fungus diseases, and who has a knowledge of wild life and the principles of park management. Intimately connected with this is the training of men for work in the National Park Service, which seems destined to a parallel development to that of the Forest Service. The training of such men should include a fundamental knowledge of silviculture, forest protection (including not only protection against fire, but also against insect and fungus enemies), wild life, including fish and game, and fur bearing animals, landscape engineering, architecture and park administration.

Not only are the forests recognized today as having a great aesthetic value because of their recreational use, but the individual trees as used in our streets and highways, our city parks and our home grounds have a part to perform in human service differing only in degree from the trees of the forest or park reservation. The selection, design, care and control of such urban tree planting, requires men with training in arboriculture and landscape architecture as well as in such branches of forestry as silviculture and dendrology. Men with such training form the material from which the modern city foresters are made.

From the above brief description of the development of the forestry profession in this country it can be readily seen that the field has broadened enormously. Just as its sister art—agriculture—has been expanded to include animal husbandry, dairying, etc., as well as the tillage of the soil, so does the broad field of forestry comprise not only the production of timber but its utilization. Consequently, the manufacture and seasoning of lumber, the manufacture of paper pulp, the distillation of wood, in short, the production and proper utilization of all crops, whether animal or vegetable, which the forest areas yields, come legitimately within the forester's realm.

From this sort of evidence it is apparent that the day of the forestry specialist is here. No longer will a single, broad, general curriculum suffice except as a foundation. The country today calls for college men who have the laboratory and practical training nec-

essary to solve the problems which confront the producer and consumer of all forest products. It is to meet these new conditions that the New York State College of Forestry has shaped its course of instruction.

Consequently the horizon of the forestry student is constantly advancing. If during the first years of College training no particular aptitude appears, the regular course closely akin to a general scientific course including silviculture, dendrology, forest surveying, etc., may be followed and the period for specializing may be confined to the fifth year. On account of the need of thorough training the College does not consider its graduates technical foresters until they have completed the five years work and have received the Master's degree. In all cases, a period of apprenticeship must be undergone after graduation to become thoroughly skilled in the application of this training, for the four year man is ordinarily but a mere beginner.

To men of executive ability, the field is broad. Logging specialists, forest engineers, surveyors and estimators, managers of public and private forests and parks—all are needed. Such lines of work appeal to men fond of a stirring life. Men with business ability will find openings of a managerial nature, while men endowed with the proper temperament will find in salesmanship, used in its broadest sense, a splendid outlet for their talents. With the financial situation which will eventually confront us after the war, the forest actuary or the financial expert, skilled in traffic and tariffs on forest products, export and credit, and other phases of forest economics and business, all will find the growing lumber industry holding forth promise to him.

To men whose tastes are along lines of Natural History and who love a life in the outdoors, certain scientific phases of forestry offer opportunities equally rich. The practical importance of forestry entomology and forest pathology is only beginning to be realized but with the inevitable development of more intensive forestry, the need for men capable of undertaking investigation and control work along these lines will certainly increase. The forest is a community comprising both plant and animal life and fire is by no means the only agency which can wipe out vast areas of valuable timber. The recent rapid spread of such fungus diseases as the Chestnut Blight and the White Pine Blister Rust, as well as the depredations of such insects as the Gypsy and Brown-tail Moth, the Hickory Bark Beetle, the White Pine Weevil, and of still more serious enemies in the West, suggest the great value, both scientific and economic, of men well trained in these lines. Fish and game have in the past been valued for the sport and recreation they furnished. Recent developments prove conclusively that the lakes and streams in our forest areas are capable of producing enormous quantities of food. Trained managers and investigators of

this aspect of forest life are needed in increasing numbers. As an indication of the increasing importance of our animal life, it might be mentioned that the Forest Service now gives its employees supervision over fish and game as well as over timber products.

The strength, structure, seasoning and staining qualities of the various species of wood must be ascertained with more accuracy in order that the right species may be used for a given purpose. Steel and concrete have to a considerable degree replaced wood in construction and manufacture largely because lumber products have been sold on a hit or miss plan, without definite knowledge of the relative value of their structure, resistance, finishing qualities, etc. The only



150 MILES FROM CAMP

At the end of the Sophomore year, every student is required to spend three months at the Sophomore Summer Camp on Cranberry Lake in the Adirondacks. Timber Estimating, Surveying, Forest Entomology and Forest Pathology are taken up both in the classroom and in the field. One feature of this camp work is a canoe trip through the Fulton Chain of Lakes, Raquette Lake, Long Lake and Raquette River, the men living in the open and studying the various types of forest on their way. The above photograph is one taken en route.



way to prevent further unwise substitution of other materials for wood and wood products is for the men who handle them to know exactly what their qualities are. The Eastern Forest Products Laboratories established in the basement of the new College Building are intended to supply this type of information.

By every token, the day of the forest specialist has come and there is place in the profession for the administrator, for the man interested in any of the various biological problems of the forest community, for the chemist and for those interested in all other phases of utilization. Each has his field and the combined work of all types of men is needed in order that the broad science and art of forestry may develop and yield its maximum service to the State and Nation. No nation can permanently prosper whose land problem is only partially solved. Since Agriculture attempts only the solution of the problems relative to that portion which can be tilled, Forestry, the art of raising and utilizing repeated crops of forest products from soils unsuited to tillage, must assist agriculture in assuring the full and proper use of our land resources.

## INVESTIGATION AND DEMONSTRATION

In meeting the first obligation of the College of Forestry, that is, the carrying on of research and state-wide investigation in Forestry, two small adjacent farms south of the city were purchased in the spring of 1912 and these have been consolidated and designated as The State Forest Experiment Station. Experimental work was begun at this Station in the spring of 1912 and there are growing at present over a million and a half of tree seedlings and transplants as experimental plantings. These have been put out to aid in definite lines of research and it is believed will mean much in determining more definitely as to proper methods of producing, transplanting and final planting of tree seedlings in this State. The College operates on this Station a State Forest Nursery for the growing of a large number of seedlings for its experimental work and for distribution to schools for planting. The operation of this well equipped Forest Nursery at the Station is of great educational value to the students of the College.

The gift of 1800 acres of land in the Adirondacks and 100 acres in the Catskills to the University for Forestry purposes adds greatly to the facilities of the College for the carrying on of very definite lines of experimental and demonstrational work. In 1913 the College purchased 1016 acres of cut-over land in Cattaraugus County and 113 acres in Madison County. These two Forest Stations are located directly adjacent to important lines of railway and have very great value for demonstrational and experimental purposes. It is believed that the work now under way on these various Forest Stations will go far towards

solving questions involved in reforestation of idle lands and will help very materially in deciding as to the best methods of handling of timber lands in every section of the State. Manifestly such facilities as these various pieces of land offer will be of great value in the work of instruction.

In addition to the facilities above mentioned for work in forest production (silviculture) and the sciences allied thereto, the College is offering special opportunities for work along forest utilization, believing that the right use of the forest crop is almost as important as its production. In this connection it has entered into formal co-operation with a large, chemical firm interested in the manufacture of various chemical products which can be obtained from wood, and has, in the course of this co-operation, equipped several laboratories in which methods of utilizing waste products such as sawdust, wood tar, etc., are being investigated. It has also, through the above mentioned co-operation, come into close touch with firms engaged in the distillation of wood, one of which maintains an experimental plant not very far from Syracuse. Thus an intimate association between this industry and the faculty and more advanced students of the College is possible. These co-operations are being handled through the Department of Forest Chemistry of the College, which deals, in its research laboratory and in these plants with a wide field of problems connected with the problems of the wood-using industries of New York State, particularly those utilizing the waste of various industries. The facilities for advanced instruction, particularly in the training of men for technical work along these lines, are unequaled.

## PLAN AND SCOPE OF INSTRUCTION

Instruction in the field of Forestry proper comprises the following:

1. Lectures and field instruction in historical and economical aspects of Forestry for all students of the University desiring a knowledge of the meaning of Forestry.
2. More extended instruction along these lines to those who desire to prepare themselves to give instruction in Forestry in the Public Schools.
3. Instruction and advice by means of lectures throughout the State before High Schools and Granges and other organizations interested in any way in the Conservation of our natural resources; the publication of Bulletins and the giving of expert advice on the ground for the benefit of owners of hill lands, of farm woodlots and of timber lands to enable owners to handle these lands so as to make them much more productive than at the present time.
4. Special service to both producers and consumers of forest pro-

ducts such as special market investigations and studies of closer utilization of waste material as may bring producer and consumer together. Co-operative marketing of farm woodlots and development of markets for such by-products of the forest as Christmas trees, burned timber and thinnings from sprout growth, already begun by the College.

5. Training of young men in such practical lines of Forestry work as will fit them to fill subordinate positions in the State and National Service. To do this work effectively, a State Ranger School is in operation on the College Forest at Wanakena, N. Y. In this School men are trained to fill such positions as Guards, Rangers, Forest Estate Managers, Tree Planting Experts and Nursery Foreman. The year of practical work in the State Ranger School does not necessarily lead to the profession of Forestry.

6. The training of professional Foresters for positions of large responsibility in the State and National Service, or as Forest Experts for private Forest work of any kind, or as City Foresters or Arboriculturists.

7. The giving of special technical training to advanced students in Forestry, in Lumbering, Paper and Pulp-making, and other phases of Forest Utilization, in Forest Management, in Dendrological Chemistry, in Forest Entomology, Forest Pathology, Forest Zoology, etc.

8. Realizing that the continued advancement of Forestry must rest upon a firmer scientific basis, the College believes that one of its most important functions will consist in the proper training of men so that they will be competent to carry on independent investigations in the various phases of scientific Forestry and in the allied sciences.

## FACILITIES FOR INSTRUCTION

Until the present year the State College of Forestry has been housed in the Lyman Hall of Natural History where the indoor instruction in forestry has been given. In 1913 the State of New York appropriated \$250,000 for a Forestry Building on the Campus of Syracuse University. This was completed during the college year of 1916-1917 and occupied by the College during the second semester. This building is one of the best and most effectively equipped Forestry Buildings in the United States.

The College is unusually well equipped with apparatus for laboratory work in Forest Botany, Pathology, Dendrology, Wood Technology, Zoölogy and Entomology and with instruments for field work in Forest Mensuration and Surveying.

The department of Forest Chemistry has two experimental plants at the disposal of the members of the department, one located on the grounds of the College, and one located at a slight distance from Syra-

cuse. These plants are equipped for work on a technical scale, so that processes developed in the laboratory can be tried out directly in large quantity. Work in these fields is facilitated by co-operations which have been established with the Bureau of Plant Industry, U. S. Department of Agriculture, with a large chemical firm interested in the production of chemicals derived from wood, and with an association of wood distillers. The co-operation with the Bureau of Plant Industry has enabled the undertaking of researches on the growth and influence of fungi on woods, and the chemical and physical changes involved. For this and other physical-chemical work the generosity of the Carnegie Institution of Washington has placed at the disposal of the laboratory a large amount of excellent equipment, while the various co-operations provide ample funds for meeting the expenses of research, as well as for fellowships. The laboratory of the department has been equipped for research in the field of pure science, as well as for more strictly technical work, and it is the policy of the department to emphasize a careful scientific study of all problems, even those whose interest is wholly commercial.

The College has a Forest Library in charge of a graduate librarian and it is being made as complete as possible in literature covering all phases of Forestry and the sciences having a bearing upon forestry. This library, in connection with the State Forest Experiment Stations located south of the city, and the excellent facilities for advanced work offered in the several scientific laboratories of the College should appeal strongly to research students.

A very complete collection of lantern slides illustrating all phases of forestry has been formed. These slides are used both for class work and for the general educational work throughout the State. A considerable quantity of demonstration and museum material has been gathered since the College opened in 1911 and is being placed on exhibit in the Forestry Building. This museum material is made up largely of the leaves and fruit of forest trees; the trunks of native trees; wood-using tools and machinery; a very complete series of panels of commercial woods; exhibits showing various phases of wood utilization, paper making, etc.; fungi and diseases of trees; fish, birds and mammals; forest insects and their work. This Forest Museum will continue to be developed and will not only be of increasing interest but of great educational value.

## FOREST NURSERY PRACTICE

The State Forest Experiment Station just south of the city offers unusual advantages for instructional work in forest nursery practice and other phases of silviculture. The well arranged seed beds and nursery rows have a capacity of millions of seedlings per year. These



seed beds are planted primarily for experimental purposes and as a result contain a large variety of different stages of growth. Besides these seed beds, experimental areas on which are established forest plantations of different organizations of trees are used for demonstrating what are the best species for planting in Central New York.

Besides the Experimental Nursery, the Station has a woodlot of thirty acres which is used for demonstration purposes in the marking of trees for thinnings and for underplanting. A large proportion of the east section of the Station is in the form of open fields, and as begun in the spring of 1913, students will plant small plots with different species of value for commercial use on wornout and idle lands in Central New York.

## FACILITIES FOR GENERAL FIELD WORK IN FORESTRY

Early in the spring of 1912, 1850 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks was given to the University for Forestry purposes by the Rich Lumber Company of Wanakena, N. Y. This land is very typical of cut-over areas in Northern New York and is splendidly adapted for general Forestry work both for the students of the State Ranger School and for the professional Forestry students. In September, 1912, the State Ranger School was opened on this tract with 16 students and two instructors. The tract is being studied carefully and during 1913 a permanent working plan was made which will be carried out over a long period of time. The School has been designated as a Branch State Weather Station. All of this offers splendid opportunity for the carrying on of research and experimental work. The Sophomore Summer Camp is held each year from June 1 to August 31 on Cranberry Lake.

Early in 1913 a tract of about 100 acres of Forest land and a good house situated along the Roaring Kill near Tannersville, in the Catskill Mountains were given to the University for the use of The State College of Forestry by John R. Strong of New York City. This is especially well fitted for general instructional work as it is covered with a very good stand of hardwoods and conifers which have not been touched since 1889.

After the gift of the forest land in the Catskills for the work of the College, three tracts of land were secured by purchase. The largest of these tracts is a piece of 1016 acres, two hours south of Buffalo in Cattaraugus County and known as the Redhouse Station. The second piece is a tract of 113 acres at Chittenango in Madison County, which was formerly the Experimental Farm of the New York Central Railroad. This Station is known as the Chittenango Forest Station and is used largely for the production of nursery stock and of

feed for the horses at the various Stations. The third and most important purchase was two small, adjacent farms of a hundred acres just south of Syracuse, lying between South Salina Street and Lafayette Road. This is known as the State Forest Experiment Station and upon it the principal forest nursery of the College is maintained. These various pieces of land upon which practical work in Forestry is carried on offer splendid facilities for instructional work. Every Forestry student is expected to carry through during his course some definite forest operation, working out the plan and carrying through each operation himself. This will give him the right practical training as well as confidence to carry on practical work.

The location of The New York State College of Forestry at Syracuse is especially favorable to the carrying out of both professional training of students and state-wide educational work. All sections of the Adirondacks are easily accessible by rail. Numerous steam and electric lines radiating in every direction from the city lay the entire region of central and northern New York open to the work of the students. There is no better strategic center with respect to solving the Forestry problems which confront the people of the State.

## REQUIREMENTS FOR ADMISSION

Students entering the regular Course leading to a degree must offer 15 units of preparatory work of High School grade. A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. It takes at least two hours of laboratory work to count as one hour of recitation. No candidate is eligible for admission to the professional courses if deficient in more than 1 count of entrance conditions. The following subjects are required for admission to The State College of Forestry:

English (four years)	. . . . .	3 Units
History (American, English, Ancient or Medieval)	. . . . .	1 "
Algebra, Elementary	. . . . .	1 "
Geometry, Plane	. . . . .	1 "
Geometry, Solid	. . . . .	1½ "
French or German	. . . . .	2 "
Physics	. . . . .	1 "
Science (Chemistry, Physics, Biology, Botany, Physiology, Zoölogy, Agriculture, etc.)	. . . . .	2 "
Drawing, Freehand or Mechanical	. . . . .	1 "
Elective (History, Language, Mathematics, Sciences, etc.)	. . . . .	2½ "

Latin (2) of the entrance requirements of the College of Liberal Arts may be substituted for one count of Modern Language. In the above list mathematics is not classed as a science.

The College in maintaining a high standard of work believes that satisfactory College work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of Forestry and that there is no shortcut to the profession. The College urges every young man who is considering the study of Forestry to make up his mind to spend all the time necessary for thorough preparation for College work. If young men before entering College could spend a summer or two or a whole year working in a lumber camp or saw mill or in some manufacturing establishment where wood is used, they would be much better prepared for professional work in Forestry.

Freshmen are accepted only at the beginning of the Fall semester. There is no opportunity to enter at midyear except on advanced standing from some other college.

## UNDERGRADUATE WORK IN THE COLLEGE OF FORESTRY

### I. THE FOUR YEAR COURSE IN GENERAL FORESTRY LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

This is essentially a general college course in which the student studies Forestry as his major subject. He should realize that this course must necessarily fall short of the measure of special training necessary for the professional Forestry degree. This course is designed for students who desire a somewhat intimate knowledge of various branches of Forestry for the general satisfaction which such knowledge gives, or for the use they can make of it in a practical way; for those who wish to prepare themselves to teach certain aspects of forestry in the public schools; or for those who after their college course wish to take subordinate positions in lumbering or manufacturing of forest products or subordinate positions in State or National Forest Service. Such students will not be entitled to the designation of Professional Foresters merely upon the completion of the four years course.

Students who at the beginning of the junior year have made an average of 80 per cent or better in their earlier work will be allowed a certain amount of specialization during their junior or senior years.

### II. THE FOUR YEAR COURSE IN CITY FORESTRY LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

The universal love of trees and the wide-spread interest in their culture and preservation among city dwellers especially has created a

demand for men who understand the propagation, planting and care of trees for city streets, parks and private grounds. The course in City Forestry is planned to train men to meet this demand. For the first two years the course is the same as that in general forestry. During the third and fourth years special courses in Arboriculture, Landscape Engineering, Pathology and Entomology are given in addition to the fundamental courses in Silviculture required of students in all courses. An unusual amount of practical work in Plane and Topographical Surveying and considerable actual field experience in so-called "Tree Surgery" is also required. In addition to the three months practical work at the Sophomore Summer Camp, six weeks of the junior summer will be devoted to field work in tree pruning and tree improvement work. The course will thus prepare men thoroughly for all lines of city forestry work; and the fundamental forestry courses required by furnishing a thorough grounding in the principles of Forestry, will fit the men to take charge of any piece of real forest land which may be acquired by cities in the future.

### III. A FOUR YEAR COURSE IN PAPER AND PULP MAKING LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

For a long time European countries have had state-supported schools of paper and pulp making and at the present time in this country many paper-mill superintendents are graduates of one of these European technical schools. As New York leads all of the other states of the Union in the consumption of pulp wood, it would seem only logical that the State College of Forestry should offer opportunities for men to train themselves in the theory and practice of paper making. The State College of Forestry is ideally located for such work as there are some 18 paper mills within twenty miles of Syracuse. The College is easily accessible, also to the Oswego River and the famous Black River district. With the equipment of laboratories of the Eastern Forest Products Laboratory students in this course will have unusual facilities for work. The course as outlined includes three distinct lines of study:

FIRST. *The Proper use of the Forest in Paper Making.* This includes not only the best methods of producing and conserving the forest so as to insure a perpetual supply of raw material but also the very important consideration of the conservation of the water supply so necessary in the transporting of pulp wood and especially in the manufacture of pulp and paper.

SECOND. *A thorough knowledge of Pulp and Paper Making Ma-*



*chinery.* The machinery used in the pulp and paper industry is by far the heaviest, most specialized and most expensive of any in the wood-using industries. A fundamental and general knowledge of mechanical engineering is needed in the manufacture of paper.

THIRD. *The Chemistry of Paper Making.* Many new varieties of the sulphite, sulphate and soda processes as well as new chemical processes are being continually developed. The whole field offers unusual opportunities for investigation.

#### IV. THE FIVE YEAR PROFESSIONAL COURSE LEADING TO THE DEGREE OF MASTER OF FORESTRY

This course is designed to prepare professional Foresters for higher positions of responsibility in the State Service, the National Forest Service and for the position of expert Forester for private concerns. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man must of necessity build his professional training upon a foundation of general culture. It is the unanimous opinion of the leaders in Forestry education and in the development of Forestry policy in this country, that men who expect to follow the profession of Forestry act unwisely if they try to make a short-cut by eliminating the foundation training. The large opportunities awaiting thoroughly trained Foresters fully justify them in devoting the full measure of time advised for preparation. It is expected that every man who takes the four year undergraduate course in the College will go on and complete his fifth year either immediately following the fourth year or after a year or two of practical work.

The fifth year of this five year course is in reality graduate work and subject to the rules governing graduate work in the College of Forestry.

#### V. GRADUATE WORK IN THE COLLEGE OF FORESTRY

Various courses lead to the degrees of Master of Forestry, Master of City Forestry, Master of Science, Doctor of Economics or Doctor of Philosophy. Information regarding the requirements for these degrees will be found on page 41.

#### VI. TRAINING IN THE STATE RANGER SCHOOL

The State Ranger School gives a practical course of one year which trains men very thoroughly for such positions as forest guard, forest ranger, forest estate manager, tree planting expert and nursery foreman. The work is largely of a practical nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of



NEW YORK STATE RANGER SCHOOL AT WANAKENA, N. Y.

This school, situated on the inlet of Cranberry Lake in the Adirondacks, gives a year's practical course to men, fitting them for Forest Guards, Rangers and Estate Managers.

various methods of logging and lumbering and nursery practice and tree planting. There is a certain amount of theoretical and field work in Botany, Geology, and Soils, Zoölogy, Entomology and Economics. It is expected that every man will have a reasonable amount of woods experience before entering upon this practical training. It is to be understood that this practical training is not an education in Forestry and that upon completion of the course a man will not be a trained Forester. A certificate is given after completion of a year of satisfactory work in the school and a diploma following a year of satisfactory practice.

## PROGRAM OF COURSES IN GENERAL FORESTRY

### FIRST YEAR

FIRST SEMESTER		SECOND SEMESTER	
	<i>Hours</i>		<i>Hours</i>
Silviculture	2	English I	3
English I	3	Chemistry I	3
Forest Botany I	3	German I or III	3
Forest Math. I	3	Mineralogy XIII.	3
Chemistry I	3	Forest Zoology I	3
German I or III	3	Forest Mathematics II	3

### SECOND YEAR

FIRST SEMESTER		SECOND SEMESTER	
	<i>Hours</i>		<i>Hours</i>
Forest Botany II	3	Forest Botany II	3
Forest Geology I	3	Forest Geology II	3
Forest Engineering I or		Physics XXII or	
Physics XXII	3	Forest Engineering I	3
Dendrology I	3	Dendrology I	3
Forest Engineering II	4	Forest Entomology I	4
		Silviculture II	3

SOPHOMORE SUMMER CAMP—FOREST ENGINEERING III. On Cranberry Lake in the Adirondacks, June 1 to August 31. Required of all students. Prerequisites—Silviculture II, Technology I, Engineering I and II, Botany I and II, Entomology I.

### THIRD YEAR

FIRST SEMESTER		SECOND SEMESTER	
	<i>Hours</i>		<i>Hours</i>
Economics I	3	Economics II	3
Forest Entomology II	4	Chemistry II	3
Silviculture IV	3	English II	3
German V	3	Forest Geology III	3
Chemistry II	3	Silviculture III	2
Forest Botany VI	3	Forest Botany III	3



## FOURTH YEAR

FIRST SEMESTER		SECOND SEMESTER	
	<i>Hours</i>		<i>Hours</i>
Silviculture V	5	Forest Economics V	3
Forest Economics VII	2	Forest Economics VI	2
Silviculture VIII	2	Forest Engineering IV	5
Dendrology II	4	Forest Utilization VII	3
Forest Zoology II	3	Silviculture VII	2
Forest Utilization I	4	Rhetoric IV	2

## PROGRAM OF COURSES IN CITY FORESTRY

First two years and Sophomore Camp same as in General Forestry.

## THIRD YEAR

FIRST SEMESTER		SECOND SEMESTER	
	<i>Hours</i>		<i>Hours</i>
Forest Economics I	3	Forest Economics II	3
German V	4	Silviculture III	2
Silviculture IV	4	English II	3
Forest Entomology III	3	Arboriculture I	3
Arboriculture I	3	Arboriculture II	2
Landscape Engineering II	4	Arboriculture III	2
		Landscape Engineering II	4

## FOURTH YEAR

FIRST SEMESTER		SECOND SEMESTER	
	<i>Hours</i>		<i>Hours</i>
Forest Utilization VII	3	Arboriculture IV	2
Landscape Engineering III	3	Landscape Engineering III	3
Landscape Engineering IV	3	Landscape Engineering IV	3
Landscape Engineering V	3	Landscape Engineering VI	2
Rhetoric IV	2	Botany VI	3
Elements of Architecture	3	Rhetoric V	2
Dendrology II	4	Forest Engineering VI	3

DESCRIPTION OF COURSES IN THE COLLEGE  
OF FORESTRY

NOTE—A numeral following the number of the course indicates the number of credit hours a week. All courses extend through the year unless followed by a Roman numeral, which limits the subject to the semester named.

*Courses open to all students of the University.*

FORESTRY. I. (a) GENERAL FORESTRY. Three hours. Place of forestry in the life of State and Nation. This is a synoptical course designed to give a general survey of the subject of forestry and other phases of conservation. Not open to students in the State College of Forestry but to all others.—I. Professor Allen.

SILVICULTURE. I. (a) FARM FORESTRY. Three hours. Development

and management of the farm woodlot. Problems of reforestation and timber production upon non-agricultural lands, relation of forest growth on idle lands to soil protection, water supply. Utilization of idle lands for the production of wood for local uses. Open to all students of the University except those in the College of Forestry.—II. Professor Stephen.

LANDSCAPE ENGINEERING. I. Two hours. Appreciation of Landscape Architecture. The principles of art which underlie landscape design. The more important historical styles of gardening. The aim of the course is to give a general knowledge of the common but little understood subject of landscape architecture, with an idea of improving the standard of tastes respecting landscape design and to awaken an increased appreciation of the beauty of the landscape as it is found in nature or modified by man. Open to men and women in the University.—II. Professor Cox.

## DEPARTMENT OF SILVICULTURE

\*DOCTOR HUGH P. BAKER, DEAN AND PROFESSOR OF SILVICULTURE,  
JOHN W. STEPHEN, PROFESSOR OF SILVICULTURE, J. FRED BAKER,  
DIRECTOR OF FOREST INVESTIGATIONS

I. 2. ELEMENTARY FORESTRY. Two hours lecture. A synoptical course covering general principles of forestry and its relation to the broad subject of conservation. This course is an introduction to the professional courses in forestry and touches briefly on the more important subjects covered later in silviculture, management, lumbering, utilization and technology.—I. Dr. Baker and heads of departments.

I. (a) 3. FARM FORESTRY. Elective. Three hours lecture. Development and management of the farm woodlot. Problems of reforestation and timber production upon non-agricultural lands, relation of forest growth on idle lands to soil protection, water supply, utilization of idle lands for the production of wood for local uses.—II. Professor Stephen.

II. 4. ELEMENTARY SILVICULTURE. Three hours lecture. Four hours laboratory. Effect of environment on tree development, the forest as a society, the effect of the forest on plants, of moist conditions within and without the forest and the effects of forests on temperature, soil, ground cover. The light relations of the forest, the struggle for existence among trees, mutual injuries and benefits. The silvicultural characteristics of different stands, pure, mixed, seedling, coppice, even and uneven aged. The life history of the forest.—I. Professor Stephen.

III. 2. TREE CHARACTERISTICS. One hour lecture. Two hours laboratory. A study of the economically important species of the United

\* On leave of absence.

## DEPARTMENT OF FOREST ENGINEERING

FREDERICK FRANKLIN MOON, ACTING DEAN AND PROFESSOR OF FOREST ENGINEERING, HOWARD BLAINE WAHA, ASSISTANT PROFESSOR OF FOREST ENGINEERING, HAROLD CAHILL BELYEA, INSTRUCTOR IN FOREST ENGINEERING

I. 3. PLANE SURVEYING. One hour lecture. Four hours field work. A preliminary course in the use of instruments including the compass, hand level, transit and level; topographic surveying, lettering and mapping; calculation of areas.—I or II. Professor Waha. This course is a prerequisite for the Sophomore Summer Camp.

II. 4. FOREST MENSURATION. Three hours lecture. Eight hours field work. A study of the measurement of trees and forests. Volume of felled and standing trees; estimating and mapping of timber, stem analysis of felled trees made to determine the rate of increase in height, diameter and volume. In addition to lectures and textbook, one full day a week is given to field practice.—I. Professor Moon.

III. SUMMER CAMP. Three months practical work in Summer Camp on Cranberry Lake at close of Sophomore Year, June 1 to August 31. Required of all Forestry students before graduation. Field work in plane and topographical Surveying, Mensuration, Field Methods, Utilization, Plant and Animal Ecology, Pathology, Entomology. Prerequisites: Silviculture II, Technology I, Engineering I and II, Botany I and II, Entomology I

IV. 4. FOREST ENGINEERING. Three hours lecture. Eight hours field work. Construction and use of forest roads, trails, telephone lines, fire towers, bridges, cabins and other features of Engineering and improvement work involved in forest practice. Particular attention paid to use of roads, trails, telephone lines in State and National forest work.—II. Professor Waha.

V. TOPOGRAPHICAL SURVEYING. Elective. Hours to be arranged. Advanced course in surveying with special attention to field sketching and the making of topographical maps, base line measurements, transit and stadia, forest topography, practice in earthwork computation.—I. Prerequisites: Forest Engineering I and II and Summer Camp.

VI. PARK AND CITY SURVEYING. Elective. Four hours field work. This course is designed for students in city forestry and will have to do with the laying out of streets, private and public grounds and parks.—II. Professor Waha.

VII. FOREST HYDROGRAPHY. Elective. Hours to be arranged. Relation of forest to rainfall and run-off; problems in stream gauging, current meters, water power sites, water power installation and problems.—II. Professor Waha. Prerequisites: Engineering I and II, and Sophomore Summer Camp.

VIII. 3. MANAGEMENT. Elective. Three hours lecture. Factors of finance which enter into the practice of forest management in this country and abroad. Regulation of yield of the forest. Students will be given practice in gathering of data and preparation of working plans for forest tracts.—I and II. Professor Moon.

IX. 2. NATIONAL FOREST PRACTICE. Elective. Two hours lecture. A brief history of National forest policy in this country, organization of the National Forest Service. The work of a typical National forest, including fire protection, timber sales, special use privileges; grazing; handling of claims and entries under Act of June 11, 1906 and other public land laws.—I. Professor McCarthy.

## DEPARTMENT OF FOREST UTILIZATION

\*NELSON C. BROWN, PROFESSOR OF FOREST UTILIZATION, EDWARD

F. MCCARTHY, PROFESSOR OF FOREST UTILIZATION, HENRY

H. TRYON, ASSISTANT PROFESSOR OF FOREST

UTILIZATION, H. L. HENDERSON, IN-

STRUCTOR IN FOREST UTILIZATION

I. 4. LUMBERING. Four hours lecture. History and development of the lumber industry and the relation between the industry and forestry. Detailed studies of methods and costs of logging, transportation and milling. Study of typical operations in different yards and milling operations. Utilization V supplements this course and is required of all Seniors taking Utilization I.—I. Professor McCarthy.

II. 1. PORTABLE MILLING AND WOODLOT LOGGING. Elective. One hour. The principles and practice of portable mill work and intensive logging and utilization. Logging plans for small woodlots and portable mill jobs. Lectures supplemented by field trips.—II. Professor Tryon.

III. 3. CURRENT PROBLEMS IN THE LUMBER INDUSTRY. Elective. Three hours lecture. A review of particular problems affecting the marketing of lumber. Special attention paid to questions of grading, inspection, selling, distribution, freight rates. Substitutes for wood considered in relation to forest utilization. The export trade and work of lumber associations.—II. Professor McCarthy.

\*On leave of absence.

IV. 3. MINOR FOREST PRODUCTS. Elective. Three hours lecture. A study of the so-called minor forest products such as veneer production, paper pulp, cooperage, maple sugar, wood distillation, naval stores, tanning and all other minor products of the forest not included in the manufacture of lumber. Special attention is paid to the utilization of waste material in milling operations and the development of new lines of utilization. Several trips are made to interesting operations in Syracuse and Central New York.—II. Professor McCarthy.

V. 4. FIELD LUMBER STUDY. Following the prerequisite course in Utilization I, a trip of two weeks to a month's duration is taken either individually or in a party to study the methods of logging and lumber manufacture in a region other than the Adirondack spruce region, which is covered in Sophomore Camp. Detail report following a prepared outline is made.—I. Professor Tryon and Mr. Henderson.

VI. 3. REGIONAL STUDIES IN LOGGING AND MILLING. Elective. Three hours. A detail study will be made to supplement elementary course in Lumbering, Utilization I, paying particular attention to the local problems and methods pursued in the lumber industry in the Northeast, the Lake States, the Southern Pineries, the Southern Appalachians, the Rocky Mountains, the California Yellow Pine, Sugar Pine and Redwood districts and the Oregon-Washington Douglas fir district.—II. Professor Tryon.

VII. 3. MECHANICAL ENGINEERING. Two hours lecture and two hours laboratory. A course especially designed to train men in a better acquaintance with steam logging, especially in connection with steam skidders, log loaders, logging engines and cable-way systems. Sawmill machinery, transmission machinery, engines, boilers, etc., are also covered in this course.—II. Professor Browning.

## DEPARTMENT OF FOREST BOTANY

DOCTOR L. H. PENNINGTON, PROFESSOR OF FOREST BOTANY, DOCTOR A. H. W. POVAH, ASSISTANT PROFESSOR OF FOREST BOTANY, DON M. BENEDICT, LABORATORY ASSISTANT IN FOREST BOTANY

*Courses I, II, III required of undergraduates.*

*Courses VI required of city foresters.*

*Courses VII, VIII, IX, X elective for undergraduates or graduates.*

*Courses XI, for graduates only.*

Students who wish to take special work in Forest Pathology should elect course VII, the first semester of the junior year.

I. 3. ELEMENTARY BOTANY. Two hours lecture. Two hours laboratory. An elementary course of lectures and laboratory work, per-



taining to the structure and functions of plants; study of the cell, root, leaf, stem, flower, fruit and seed; lectures and demonstrations explaining the functions of these plant parts and the fundamental problems of biology as shown by plants.—I. Doctor Pennington and Mr. Benedict.

II. 3. GENERAL FOREST BOTANY. One hour lecture. Four hours laboratory. Lectures and laboratory work. A course designed primarily to give a general survey of the whole plant world. It comprises a study of representatives of the principal groups in their order from the simplest unicellular plants to the most highly developed flowering plants. Especial attention is given to the classification of forest fungi and flowering plants.—I. and II. Doctor Povah. Prerequisite, course I.

III. 3. PLANT PHYSIOLOGY. Two hours lecture. Two hours laboratory. Lectures and laboratory work. A course designed to teach, largely by experiments, the fundamental physiological processes involved in the nutrition, growth and reproduction of plants. Especial attention is given to the behavior of plants in relation to light, heat, soil and water conditions.—II. Doctor Pennington. Prerequisites: courses I and II.

VI. 3. FOREST PATHOLOGY. Elective. One hour lecture. Four hours laboratory. A course of lectures, textbook and laboratory work upon the diseases of plants in general with especial emphasis upon diseases of trees. Considerable attention will be given to decay of timber, pathological histology and disease control.—I or II. Doctor Pennington. Prerequisites: Courses I and II.

VII. 3. GENERAL MYCOLOGY. Elective. One hour lecture. Four to six hours laboratory. A course consisting of lectures and laboratory work upon a systematic study of the structure and life histories of fungi. Although representatives of all the principal families will be studied, special attention will be given to forest fungi.—I. Doctor Pennington. Prerequisites: Courses I and II.

VIII. 3. ADVANCED FOREST PATHOLOGY. Elective. One hour lecture. Four hours laboratory. A course consisting of laboratory work, lectures, reports and conferences upon the more important phases and problems of forest pathology. In the laboratory considerable attention will be given to the technique involved in the isolation and cultivation of pathogenic fungi.—I and II. Doctor Pennington. Prerequisites: Courses I, II, IV and V.

IX. 3. MORPHOLOGY AND TAXONOMY. Elective. One hour lecture and 5 hours laboratory and field work. This course may be elected as IX(a) Morphology and Taxonomy of Cryptogams (exclusive of fungi) I or

IX(b) Morphology and Taxonomy of Phanerogams. II. This course is designed to supplement Botany II and should be elected by all students who plan to take up research in Botany or Pathology. Dr. Povah.

XI. RESEARCH IN FOREST BOTANY. Elective for graduates. Hours to be arranged. Provision is made for properly qualified students to undertake problems in various phases of Forest Botany, as Pathology, Physiology, Ecology, Histology,, and Range and Grazing.—I and II. Doctors Bray, Pennington and Povah.

## DEPARTMENT OF FOREST ENTOMOLOGY

DOCTOR M. W. BLACKMAN, PROFESSOR OF FOREST ENTOMOLOGY, CARL J. DRAKE, INSTRUCTOR IN FOREST ENTOMOLOGY

*Courses I and II are required of all undergraduates in the course in regular Forestry.*

*Courses I and III are required of all undergraduates in the course in City Forestry.*

*Courses VI, VII, VIII, IX and X may be taken either as special undergraduate work or as minors in the graduate courses.*

*Courses XI can be taken only as major graduate work.*

I. 4. ELEMENTARY ENTOMOLOGY. Two hours recitation. Four hours laboratory. A general course devoted to the study of the morphology, life histories and general classification of insects. Designed as an introduction to advanced work and to work in economic Forest Entomology.—II. Doctor Blackman, Mr. Drake and Assistants. Forest Zoölogy I is prerequisite for this course.

II. 4. FOREST ENTOMOLOGY. Two hours lecture. Four hours laboratory. Devoted to a study of those insects sustaining intimate relations to economic problems of Forestry. This course includes study in the laboratory and in the field of the morphology, classification, life histories and habits of both beneficial and injurious insects and methods of controlling the latter.—I. Doctor Blackman and Assistants. Course I is prerequisite.

III. 3. INSECTS AFFECTING SHADE TREES AND ORNAMENTAL SHRUBS. Two hours, lecture. Two hours, laboratory. A study of the morphology, life histories and habits of insects affecting ornamental trees and shrubs with methods of combatting them. Intended primarily for students specializing in City Forestry.—I. Mr. Drake. Course I is prerequisite.

VI. 3. ADVANCED FOREST ENTOMOLOGY. Elective. One hour conference. Four hours laboratory or field. Consisting of laboratory



work, field work and library investigation. The field work is planned to give practical instruction and practice in locating, studying and preparing reports upon infestations of forest insects. Each student will be assigned certain subjects for library investigations upon which he will report and lead the discussion at the weekly conferences.—I or II. Doctor Blackman. Courses I and II are prerequisite.

VII. INSECT ANATOMY. Elective. Hours to be arranged. A more detailed study of the anatomy of certain insects not studied in previous courses. Doctor Blackman and Mr. Drake.

VIII. INSECT TAXONOMY. Elective. Hours to be arranged. A more detailed study of the classification of some particular group of insects. Doctor Blackman and Mr. Drake.

IX. INSECT HISTOLOGY. Elective. Hours to be arranged. Consisting of practice in the methods of preparation of insect tissues and a careful microscopic study of the tissues and organs of insects. Doctor Blackman.

X. PROBLEMS IN FOREST ENTOMOLOGY. Elective. Hours to be arranged. Individual study of small problems in forest entomology. Intended to serve as training and practice in the investigation of technical problems.—I or II. Doctor Blackman.

XI. RESEARCH PROBLEMS IN FOREST ENTOMOLOGY. Elective. For graduate students. Hours to be arranged. Research problems in various phases of forest entomology will be assigned to students possessing the proper training and qualifications for independent original investigation.—I and II. Doctor Blackman.

## DEPARTMENT OF FOREST ZOOLOGY

DOCTOR C. C. ADAMS, PROFESSOR OF FOREST ZOOLOGY, C. F. CURTIS RILEY,  
SPECIAL LECTURER IN ANIMAL BEHAVIOR

*Zoölogy I is required of all Freshmen.*

*Zoölogy II is required of all Seniors in regular Forestry.*

*Zoölogy III, IV and V are open to Seniors and Graduates.*

*Zoölogy VI is open only to Graduates.*

*Zoölogy VII is open to all students of the University.*

These courses are designed as a training in the scientific principles underlying the relation of animals to forest lands and waters, and the application of these principles to the economic problems concerned with birds, fish, game, fur-bearing and other forest animals.

I. 3. GENERAL ZOOLOGY. Two hours recitation. Three hours laboratory. A course in general principles of Zoölogy. The work consists

of laboratory and field study of animals, together with lectures and recitations upon the physiology, anatomy and ecology of the forms studied and a discussion of the general problems involved.—II. Professor Riley, Doctor Adams and Assistants.

II. 3. FISH AND GAME. One hour lecture. Four hours laboratory or field. A course devoted primarily to a study of the more common fish, game and forest animals, including their propagation, their protection and their relation to the utilization of forest lands.—I. Doctor Adams and Assistant. Prerequisite: Zoölogy I or equivalent and Entomology I.

III. 3. ECOLOGY OF FRESH WATER ANIMALS. Elective. One hour lecture. Four hours laboratory or field. This course is intended to give a scientific foundation for the application of animal ecology to the aquatic life of the lakes and streams of forest lands. Special emphasis is placed upon methods of investigation so as to make the work preliminary to the study of the problems concerned with the utilization of the aquatic resources of forest lands. It is particularly useful to those interested in fish, fish culture and allied problems. Doctor Adams. Prerequisite: Zoölogy.

VI. ECOLOGY OF FOREST ANIMALS. Elective. One hour lecture. Four hours laboratory or field. This course is complementary to the preceding and is devoted to a training in the scientific foundations and the application of ecology to the land animals of coniferous and hardwood forests. This training is intended to prepare the student to understand and investigate the relations of animals to the management of forest lands. Particular emphasis is placed upon upland game birds and mammals, fur-bearing animals, the relation of birds to woodlands, game vermin, and the relation of animals to forest soils. It is particularly useful to those interested in forest animals and allied woodland problems. Doctor Adams. Prerequisite: Zoölogy II.

V. PROBLEMS IN FOREST ZOÖLOGY. Elective, hours to be arranged. Individual study of special Zoölogical problems. Doctor Adams. Prerequisites: Zoölogy I and II.

VI. ECOLOGICAL RESEARCH IN ZOÖLOGY. Elective to students. Hours to be arranged. Advanced individual investigation for properly qualified students of ecological problems on forest, fish and game animals. Doctor Adams.

VII. 2. HABITS OF BIRDS. Elective. A course devoted to the general habits, behavior and identification of birds, with some attention given to other animals. Consisting of conferences and field excursions for bird study. Intended as an introduction to the study of birds. Of value to teachers of Zoölogy, nature study, and forestry students. Open to all students of the University.—I. Professor Riley.

## DEPARTMENT OF CITY FORESTRY

LAURIE D. COX, ASSISTANT PROFESSOR OF LANDSCAPE ENGINEERING,  
 \*ALAN F. ARNOLD, EDGAR F. PEDDIE, INSTRUCTORS IN LANDSCAPE  
 ENGINEERING

*Arboriculture I, II, III and IV and Landscape Engineering II, III, IV, V and VI are required of all undergraduates in City Forestry.*

*Arboriculture II and III and Landscape Engineering V are elective by students in Technical Forestry.*

*Landscape Engineering I and VII are elective.*

## ARBORICULTURE

I. 3. PLANT MATERIALS. Two hours lecture. Two hours laboratory. Deciduous and Evergreen shrubs, vines and perennials, their identification and use.—I and II. Professor Cox and Mr. Peddie.

II. 3. PRUNING AND CARE OF TREES. Two hours lecture. Two hours laboratory. Propagation, pruning and planting of ornamental trees, tree surgery, etc.—II. Mr. Peddie.

III. 2. SHADE AND ORNAMENTAL TREES. Two hours lecture. A continuation of Arboriculture I. The identification and use of ornamental trees.—II. Mr. Peddie. Prerequisite: Arboriculture I.

IV. 2. STREET TREE PLANTING. One hour lecture. Three hours laboratory. The selection and planting of street trees and their relation to street design. Plans and reports for street tree planting.—II. Professor Cox.

## LANDSCAPE ENGINEERING

I. 3. THE APPRECIATION OF LANDSCAPE ARCHITECTURE. Two hours lecture. One hour reports, etc. The elements and principles of Landscape design. Lectures and reports.—II. Professor Cox.

Not open to professional students but to all other students of the University.

II. 4. ELEMENTS OF LANDSCAPE ENGINEERING. Two hours lecture. Four hours drafting. Elements and principles of landscape engineering. Lectures and drafting practice.—I and II. Professor Cox and Mr. Peddie.

III. 3. LANDSCAPE ENGINEERING DESIGN. One hour lecture. Six hours drafting, senior year. Elementary design in Municipal Landscape Engineering.—I and II. Professor Cox and Mr. Peddie. Prerequisite: Landscape Engineering II.

IV. 3. LANDSCAPE ENGINEERING CONSTRUCTION. Two hours lecture.

\*On leave of absence.

Three hours drafting. Highway design and engineering, drainage and grading problems.—I and II. Professor Cox. Prerequisite: Landscape Engineering III.

V. 4. CITY PLANNING. Two hours lecture. Two hours drafting. Street design in its relation to city planning.—I. Professor Cox.

VI. 2. LANDSCAPE ENGINEERING DETAILS. One hour lecture. Three hours drafting. Design of structures used in Municipal Landscape Engineering, retaining walls, fountain steps, pergolas, park and recreation buildings, conservatories, etc.—I. Professor Cox. Prerequisites: Landscape Engineering II and III.

VII. LANDSCAPE ENGINEERING DESIGN. Elective. Advanced landscape engineering. Design for fifth year students.—I and II. Professor Cox.

## DEPARTMENT OF FOREST CHEMISTRY

DR. S. F. ACREE, PROFESSOR OF FOREST CHEMISTRY, MR. H. K. SMITH, RESEARCH ASSISTANT, FOREST CHEMISTRY, (FULLER FUND), MR.

M. R. MEACHAM, RESEARCH ASSISTANT, FOREST CHEMISTRY, (FULLER FUND), MR. J. L. ESSEX, RESEARCH ASSISTANT, FOREST CHEMISTRY, (FULLER FUND), MR. E. N. HOPSON, RESEARCH ASSISTANT, FOREST CHEMISTRY, (FULLER FUND).

II. 3 OR 5. ORGANIC CHEMISTRY. Two hours lecture and two or six hours laboratory. This course includes the general outlines of organic chemistry, with especial emphasis on the chemistry of woods, plants and plant growth, and the naturally occurring chemical products interesting from a cultural standpoint. Ample time is given to a discussion of the various wood-using chemical industries, such as wood distillation, the manufacture of grain alcohol from sawdust, oxalic acid manufacture, the turpentine industries, and related subjects.—I and II. Doctor Acree.

III. INDUSTRIAL CHEMISTRY APPLIED TO WOOD PRODUCTS. Hours to be arranged. This course presents the technique of those wood using industries in which chemical processes are of considerable importance. The particular industrial processes discussed are the chemical side of wood preservation, tanning, wood distillation, the production of grain alcohol from wood waste and sulphite liquors, the turpentine industries, etc. This course is distinguished from Chemistry II above in the more detailed and full discussion given and the greater amount of chemical knowledge required of the student. Dr. Acree. Prerequisite: Forest Chemistry II.

IV. 2. SUGAR, STARCHES AND CELLULOSES. Two hours lecture, one semester. The reaction constitutions and configurations of the natural

and synthetic carbohydrates. Dr. Acree. Prerequisite: Forest Chemistry II.

V. 2. DYESTUFFS. Two hours lecture; one semester. The constitution and synthesis of the most important vegetables and aniline dyestuffs and intermediates. Dr. Acree. Prerequisite: Forest Chemistry II.

VI. 2. The application of quantitative and physical methods to the problems of organic chemistry. Two hours lecture; one semester. Dr. Acree. Prerequisites: Forest Chemistry II, Chemistry X, and a knowledge of calculus.

VII. 2. Special topics in advanced organic chemistry. Two hours lecture; one semester. Stereochemistry as applied to natural products, terpenes, alkaloids and tannins. Dr. Acree. Prerequisite: Forest Chemistry II.

VIII. Research in organic or physical organic chemistry. Hours to be arranged. For students who are candidates for higher degrees. These may select problems connected with the topics mentioned in the lecture courses, provided they bear on the general problems of the department. Research may also be undertaken in the field of work connected with the chemical action of fungi, using the facilities provided by the Bureau of Plant Industry, U. S. Department of Agriculture, through the cooperation previously mentioned. Dr. Acree. Prerequisites to be determined.

IX. 2. SEMINAR. Two hours weekly; both semesters. A seminar on topics suggested by the work of the department. Dr. Acree.

## DEPARTMENT OF FOREST ECONOMICS

DOCTOR FREDERICK W. ROMAN, PROFESSOR OF ECONOMICS, HARRY

E. BARNES, INSTRUCTOR IN ECONOMICS

(Both of the College of Liberal Arts)

I. 3. THE ELEMENTARY PRINCIPLES OF ECONOMICS IN THEIR RELATION TO FORESTRY. Three hours lecture. This course will present those elementary principles of economic science which are essential as an introduction to a more specialized course in forest economics. It will analyze the chief problems connected with the four great economic processes of the production, exchange, distribution and consumption of wealth. The chief topics treated will be: the factors of production, the law of diminishing returns, the cost of production, the division of labor and economic specialization, the concentration of industry, utility value, price competition and monopoly, international trade and its regulation; wages, rent, interest, profits; the standard of living, luxury, welfare, and the relations of the state to economic activity. Lectures, recitations, readings and reports.—I. Mr. Barnes.

II. 3. THE ECONOMICS OF FORESTRY. Three hours lecture. An



opportunity is afforded in this course for a more specialized study of the economics of forestry. The relation of forests to civilization and the proper attitude of society towards forests; the origin and growth of the conservation movement; the special relation of forests to conservation problems; the economic value of forests, including their value as productive private property; their relation to the conservation of water and public safety, navigation, grazing, recreation, public health, labor; their function as a refuge for game; forest taxation; tariff on lumber; foreign and domestic market conditions; the exploitation of forest products and its effect; the national requirements in the way of forest products; their manufacture and transportation. Lectures, recitation, readings and reports.—II. Mr. Barnes.

III. 5. MONEY. CREDIT AND BANKING. Three hours lecture. The nature and functions of money, development of money in the United States, credit and credit currency; types of banking systems; handling checks, drafts and exchange; the Federal Reserve Act.—I. Professor Roman.

IV. 3. LABOR PROBLEMS. Elective. Three hours lecture. The laboring classes before the nineteenth century; development of trade unionism in England and America; strikes; collective bargaining and trade agreement; arbitration; machinery and division of labor; unemployment; labor legislation; immigration; profit-sharing; cooperation; the trend of wages; labor politics and labor parties in America and other countries.—I and II. Professor Roman.

V. 3. BUSINESS LAW. Three hours lecture. A general survey of subjects most closely connected with the ordinary transactions of business. The purpose of the course is to give the man of affairs a knowledge of the general character and extent of his legal rights and duties.—II. Professor Roman.

*Additional Courses in strictly forestry phases of economics are given by Professor J. Fred Baker and Mr. Henderson of the College of Forestry Faculty..*

VI. 2. FOREST LAW. Two hours lecture. The object of this course is to gain a general knowledge of forest law. The Federal Laws, with particular reference to the acquisition of the public domain in the West will be taken up. The forest laws of the principal states engaged in forestry work will be discussed and studied in detail. Forest taxation, legislation and management of state reserves will also be discussed.—II. Professor Henderson.

VII. 3. FOREST HISTORY. Three hours lecture. The history of European Forestry with application to present conditions existing in the United States; statistical statement of timber production and consumption, import and export and present supply of timber in each of these countries.—I. Professor Baker.

## COURSES FOR STUDENTS IN THE COLLEGE OF FORESTRY GIVEN BY ACCESSORY INSTRUCTORS

These courses are given by Departments in the College of Liberal Arts, Applied Science and Fine Arts of the University.

### *ENGLISH*

I. 3. COMPOSITION AND RHETORIC. Study of the principles of composition; reading from the English classics; short and long themes; conferences.—I and II. Professors Baebenroth and Wharton.

II. 3. ENGLISH COMPOSITION. Exposition, description and narration themes of two kinds, daily themes and long themes; lectures and conferences.—II. Professor Baebenroth.

### *RHETORIC*

IV. 2. PUBLIC ADDRESS. Lectures, classroom declamations. Addresses for all occasions are written and delivered. Parliamentary drill. Ex-temporaneous speaking and criticism.—I. Professor Parmenter.

V. 2. ADVANCED PUBLIC ADDRESS. Original orations. Platform etiquette. Hymn and Bible reading.—II. Professor Parmenter.

### *GERMAN*

I. 3. ELEMENTARY COURSE. Grammar. Translation from German into English, and elementary exercises in translating into German. Special emphasis on oral work.—I and II. Professor Gorse.

III. 3. GRAMMAR AND READING. Oral work and composition.—I. and II. Professor Gorse.

V. 3. SCIENTIFIC GERMAN. Intended to furnish drill in the reading of modern scientific German and is recommended to students pursuing courses in the natural sciences.—II. Doctor Kullmer.

### *MATHEMATICS*

I. 3. TRIGONOMETRY. The solution of triangles with and without logarithms including the derivation of the necessary formulae; the study of the trigonometric functions as functions; the derivation and application of formulae involving the functions of one or more angles; the transformation of expression involving the functions; the solution of trigonometric equations.—I. Professors Bullard and Decker.

II. 3. SOLID GEOMETRY. The study of lines, surfaces and solids with reference to the development of space intuition and the observation and establishment of geometrical properties; numerical application.—II. Professor Decker.



*BOTANY*

I. 4. RANGE AND GRAZING. Elective. Two hours. Lectures assigned reading and conferences upon range and grazing problems.—II. Doctor Bray. Prerequisites: Forest Botany I and II.

*CHEMISTRY*

I. (a) 3. ELEMENTARY CHEMISTRY. A brief course consisting of two recitations and one laboratory period per week. Professor Cooper, Instructors Buell and Phelps.

Once a month an experiment lecture is substituted (Wed. 2 p.m.) for the second recitation of the week.

For the benefit of high school graduates who feel competent to pass an examination in this subject an advanced standing examination will be offered at the time of the September supplementary examination and again September 30, 2 p.m., in Bowne Hall. Certified notebooks must be presented.

*GEOLOGY*

I. 5. PHYSIOGRAPHY. Two hours lecture. Two hours laboratory. Lecture, recitations, laboratory and field work.—I. Professor Brainard.

II. 3. GENERAL GEOLOGY. Two hours lecture. Two hours laboratory. Lectures, recitations, laboratory and field work.—II. Professor Brainard.

III. 3. GEOLOGY OF SOILS. Two hours lecture. Two hours laboratory. Geology of Soils, Water and Fertilizers.—II. Professor Brainard.

*PHYSICS*

XXII. 3. GENERAL PHYSICS. Two hours lecture. Two hours laboratory. Lectures recitations and laboratory work on mechanics and heat.—I and II. Doctor Birge.

## GRADUATE WORK IN THE COLLEGE OF FORESTRY

Graduate work in the College has been planned for the purpose of production of two different types of men—first, the man with a more complete, broad, general training in forestry and, second, the specialist capable of investigating special economic and scientific problems of forestry. The broad, general training is designed to fit men for administrators of state, national or private forests or parks. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man to be successful must build his professional training upon a broad foundation. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting at least five years of study in preparation. For this reason it is strongly urged that every man who takes the four year undergraduate course in the College, return and complete his fifth year either immediately following the fourth year or after a year or two of practi-

cal work. Until he does this the College cannot place the stamp of Forester upon him. The five-year course mentioned leads to the degree of Master of Forestry. Similarly a fifth year spent in advanced work in Landscape Engineering and Arboriculture leads to the degree of Master of City Forestry.

The degree of Doctor of Economics, the requirements for which are given at another place, is designed to appeal particularly to two general classes of men. First—To recent graduates in Forestry whose abilities and tastes lead them to prepare more fully for administrative positions in Colleges, for general educational work along lines of forestry and general conservation, or for administrative work in state or national departments of forestry and parks. Second—It is hoped that the degree will also appeal to men who have made a distinguished success in administrative affairs connected with forestry and who wish to earn an advanced technical degree.

Two of the most important functions of the College are the conducting of investigations in forestry and the proper advanced training of men that they may be competent to undertake investigations. The College of Forestry thoroughly believes that the symmetrical advancement of forestry in the future depends not only on men possessing the broad, general training in forestry but is equally dependent upon the men who in addition to a general knowledge of forestry have specialized in one of its various economic or scientific phases. There are a vast number of technical and scientific problems which must be solved before forestry really comes into its own in this country and such problems can only be solved by the man who has been especially trained in methods of investigation and who is thoroughly conversant with all the previous researches along his particular line. The College of Forestry is, therefore, offering graduate work in all phases of scientific forestry, such as silviculture, dendrology, forest pathology, forest entomology, forest zoology, wood chemistry, etc. These courses are planned for the express purpose of educating technical investigators competent to undertake independent research. The opportunities for advancement, both scientifically and materially, are good and bound to be especially favorable in the future. Men capable of doing investigative work are especially needed in the National Forest Service, in the National Park Service, in the various State Departments of Forestry, in the Forest Experiment Stations and in the various commercial laboratories, as well as in teaching and investigative work in connection with educational institutions.

This graduate work is open not only to graduates of forestry courses but under certain restrictions, mentioned in another place, to men whose undergraduate work has been along other scientific lines. Two degrees are open to men taking such work—Master of Science and Doctor of Philosophy, the requirements for which are given at another place.

## RULES GOVERNING GRADUATE WORK IN THE COLLEGE OF FORESTRY

### DEGREES OFFERED

The following degrees will be conferred upon the satisfactory completion of approved schedules of courses and of the other requirements:

Master of Forestry, Master of City Forestry, Master of Science, Doctor of Economics and Doctor of Philosophy.

It should be understood that the time requirements mentioned below are minimum requirements only. The College does not obligate itself to grant degrees, except upon the completion of all of the work in a manner satisfactory to its faculty. The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.

### MAJORS AND MINORS

At the time of enrolling, the candidate for a degree shall submit a schedule consisting of not more than 15 semester hours in each semester. This schedule shall be distributed between a major of nine semester hours and two minors of three semester hours each. If so desired, both the major and one minor may be taken in one department or both minors may be taken in one department. This schedule must receive the approval of the graduate committee and the Dean.

### REQUIREMENTS FOR THE DEGREE OF MASTER OF FORESTRY

For the successful prosecution of the work the ability to read German at sight is necessary.

For candidates who are graduates of approved courses in technical forestry a minimum of one year of residence work is required. For graduates in other courses a minimum of two years residence work will be necessary.

A thesis or report showing the candidate's ability to complete satisfactorily an investigation upon a topic connected with the candidate's major study must be submitted to the professor in charge not later than May 1 of the year in which the candidate receives his degree. This, if approved by the professor in charge, and if acceptable to the graduate committee is so endorsed and a copy is deposited in the library.

Upon the acceptance of his thesis the candidate will be notified and provided he has satisfactorily passed written examinations in all his courses he will at the same time be instructed when to appear for an oral examination. This examination will be given by the pro-

fessors under whom the candidate's work has been taken—the Dean or some member of the graduate committee acting as chairman. Any member of the faculty is privileged to be present and to participate. This examination will not take place later than June 1.

#### REQUIREMENTS FOR THE DEGREE OF MASTER OF CITY FORESTRY

A reading knowledge of French is desirable.

For students who are graduates of the course in City Forestry in this College or who have had equivalent courses, a minimum of one complete year of residence work of acceptable grade along approved lines is required.

Similar requirements with regard to thesis and oral examination as for the Master of Forestry degree are in force.

#### REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

For the successful completion of the work, the ability to read German at sight is necessary.

For students who are graduates in forestry of this institution or others of similar grade, a minimum of one year of residence work of an acceptable grade is required.

Students who are graduates in lines other than forestry may be recommended for their degree on the completion of one year of satisfactory residence work provided at least one-third of their course work is in forestry courses. *The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.*

Similar requirements are made as regards thesis and oral examination as for the preceding two degrees.

#### REQUIREMENTS FOR DEGREE OF DOCTOR OF ECONOMICS

Candidates must hold either the Bachelor's degree in which forestry was the major work, the degree of Forest Engineer or the Master's degree in Forestry from a college of approved standing. Before beginning the second year of graduate work the candidate must demonstrate his ability to read German and French at sight.

In case the candidate holds the Bachelor's degree only, a minimum of three years residence work is required. One year's residence work in graduate work in another college may be substituted at the discretion of the Dean and graduate committee.

In case the candidate holds the degree of Master of Forestry and has in a distinguished manner completed not less than three years

of approved administrative work in Forestry the minimum residence requirements shall be one year.

Under no condition shall this degree be granted as an honorary degree but it shall stand for a certain amount of co-ordinated study along the line of broad problems of economics and administration with special regard to the development of state and national forest policy.

A thesis demonstrating the results of research and original thought upon some phase of forest economics is required. This must be satisfactory to the Dean and the members of the graduate committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the College Library.

The candidate is required to pass two examinations, both oral. The preliminary examination will cover the entire subject of forestry with particular reference to the economic phases. The examination will be upon the candidate's thesis.

#### REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

A candidate must be a graduate of a college of approved standing and his undergraduate training must have been such as to fit him to pursue advanced work in the subject which he chooses as his major. Before beginning the second year of graduate work the candidate must demonstrate his ability to read scientific German and French at sight.

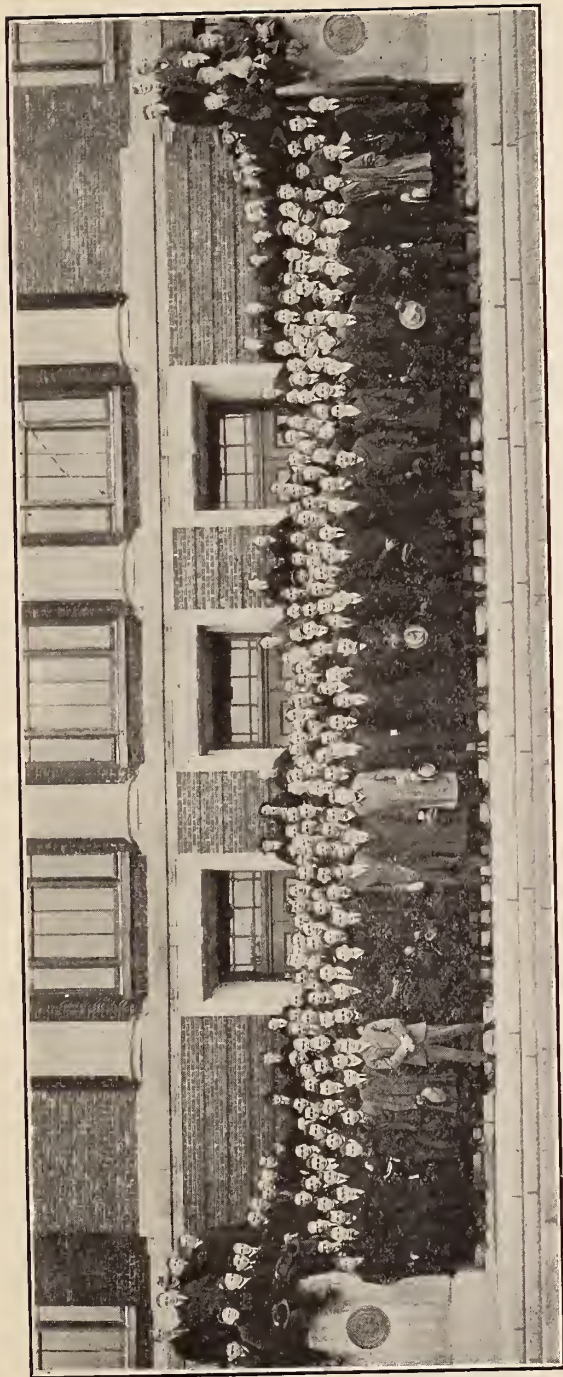
In case the candidate holds merely the bachelor's degree, a minimum of three years graduate work is required. One year's residence in graduate work at another college may be substituted with the approval of the Dean and graduate committee.

At the time of enrolling the candidate must choose the major study and two minor studies subject to the same rules as those governing other graduate work. If the candidate is not a graduate in forestry at least one of these minors during two years of his course must be in forestry.

A thesis demonstrating the results of scientific research upon a topic bearing upon his major subject must be completed and receive the approval of the major professor not later than May 1st of the year in which the degree is granted. This must be satisfactory to the Dean and graduate committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the college library.

The candidate is required to pass two examinations, both oral. The preliminary examination will be upon the subjects covered by his major and minors. The final examination will be upon the candidate's thesis.





FACULTY AND STUDENTS OF THE COLLEGE OF FORESTRY—APRIL, 1917

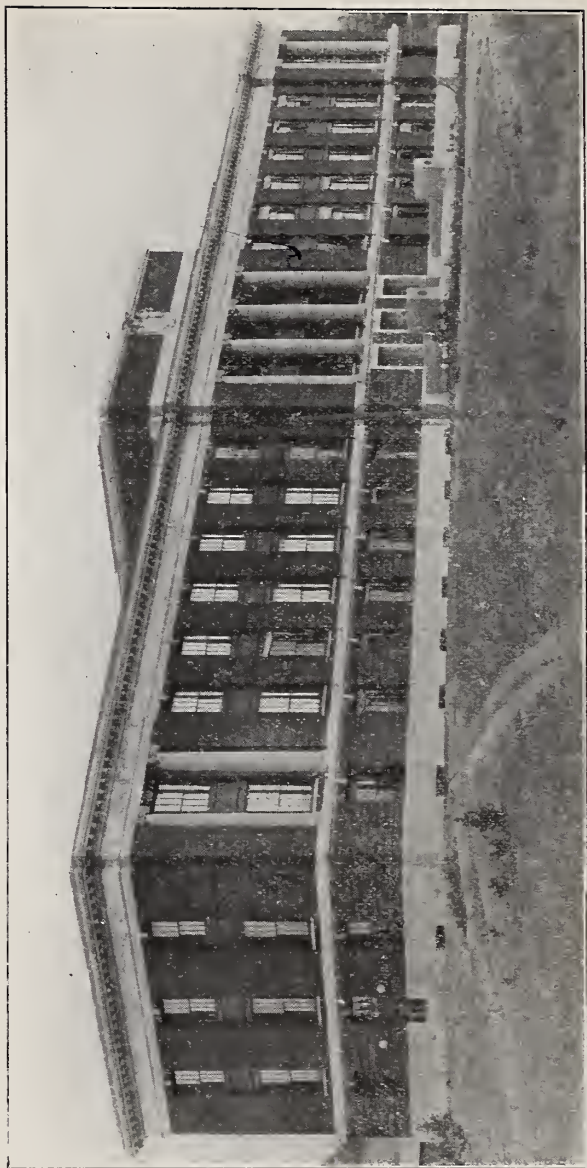












THE NEW YORK STATE COLLEGE OF FORESTRY AT  
SYRACUSE UNIVERSITY, SYRACUSE, N. Y.

# CIRCULAR No. 30

OF

## The New York State College of Forestry

AT

SYRACUSE UNIVERSITY

### Announcement of Courses



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# CALENDAR

## FIRST TERM, 1919-20

1919

Sept. 12-16	Friday-Tuesday	Entrance and supplementary examinations
Sept. 15-16	Monday-Tuesday	Registration
Sept. 16	Tuesday	First semester begins. Tuition (Non-residents of the State) and fees due
Sept. 17	Wednesday	Special Convocation, Room 300, College of Forestry, 9 A. M.
Oct. 1	Wednesday	Senior registration
Nov. 4	Tuesday	Election Day. No classes
Nov. 27-29	Thursday-Saturday	Thanksgiving recess
Dec. 1-2	Monday-Tuesday	Supplementary examinations
Dec. 19-Jan. 1	Friday-Thursday	Christmas recess

1920

Jan. 23	Friday	First semester ends
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## SECOND TERM, 1919-20

Jan. 26-28	Monday-Wednesday	Senior Week. Registration for second semester
Jan. 29	Thursday	Second semester begins. Tuition (Non-residents of the State) and fees due
April 1-7	Thursday-Wednesday	Easter recess
April 8-9	Thursday-Friday	Supplementary examinations
April 28-30	Wednesday-Saturday	Junior examinations
June 4-9	Friday-Wednesday	Commencement Week

# TRUSTEES OF THE NEW YORK STATE COLLEGE OF FORESTRY

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DR. JOHN HUSTON FINLEY, Commissioner of Education..	Albany, N. Y.
HON. GEORGE D. PRATT, Conservation Commissioner....	New York City
HON. HARRY WALKER, Lieutenant Governor.....	Binghamton, N. Y.

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FACULTY OF THE NEW YORK STATE COLLEGE  
OF FORESTRY  
AT SYRACUSE UNIVERSITY

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JAMES ROSCOE DAY, S.T.D., D.C.L., LL. D.  
*Chancellor of the University*

HUGH POTTER BAKER, M. F., 1904 (Yale); D. Oec., 1910 (Munich)  
*Dean of the College; Professor of Silviculture*

\*FREDERICK FRANKLIN MOON, B.A., 1901 (Amherst); M.F.,  
1909 (Yale)  
*Professor of Forest Engineering*

\*MAULSBY WILLET BLACKMAN, A.B., 1901; A.M., 1902  
(Kansas); Ph.D., 1905 (Harvard)  
*Professor of Forest Entomology*

EDWARD F. MCCARTHY, B.S., 1911; M.S.F., 1916 (Michigan)  
*Professor of Forest Utilization*

\*NELSON COURTLANDT BROWN, B.A., 1906; M.F., 1908 (Yale)  
*Professor of Forest Utilization*

LEIGH H. PENNINGTON, A.B., 1907; Ph.D., 1909 (Michigan)  
*Professor of Forest Pathology*

\*SEWARD D. SMITH, B.S., M.S.F., 1910 (Michigan)  
*Director of State Ranger School*

JOHN WALLACE STEPHEN, B.A., 1907; M.S.F., 1909  
(Michigan); M. Pd., 1915 (Michigan Normal College)  
*Professor of Silviculture*

CHARLES CHRISTOPHER ADAMS, B.S., 1896 (Illinois Wesleyan);  
M.S., 1899 (Harvard); Ph.D., 1908 (Chicago)  
*Professor of Forest Zoology*

HARRY P. BROWN, A.B., 1909; A.M., 1910, Ph.D., 1914 (Cornell  
University)  
*Professor of Wood Technology*

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\*On leave of absence.

SOLOMON F. ACREE, B.S., 1896; M.S., 1897 (Texas); Ph.D., 1902 (Chicago); F.C.S.

*Research Professor in Forest Chemistry*

ROBERT CRAIG, JR., M.S.F., 1910 (Michigan)

*Acting Director and Professor of Forestry at the New York State Ranger School*

LAURIE D. COX, A.B., 1903 (Arcadia College; S.B. in Landscape Architecture, 1908 (Harvard)

*Professor of Landscape Engineering*

HENRY R. FRANCIS, B.S., 1910 (Massachusetts Agricultural College)

*Professor of Forest Recreation*

L. E. WISE, A.B., 1907; Ph.D., 1911 (Columbia)

*Professor of Forest Chemistry*

WARREN B. BULLOCK, A.B., 1899 (Laurence College)

*Professor of Forest Extension*

RUSSELL T. GHEEN, B.S., 1912 (Pennsylvania State College);

M. F., 1914 (New York State College of Forestry)

*Professor of Forest Extension*

REUBEN PARKER PRICHARD, B.S., 1907 (Dartmouth); M.F., 1909 (Yale)

*Assistant Professor of Silviculture*

ALFRED HUBERT WILLIAM POVAH, A.B., 1912; Ph.D., 1916 (Michigan)

*Assistant Professor of Forest Botany*

HIRAM LEROY HENDERSON, B.S., 1915 (Michigan)

*Assistant Professor of Forest Utilization*

CARL JOHN DRAKE, B.S., B.Ped., 1912 (Baldwin-Wallace);

A.M., 1914 (Ohio State University)

*Assistant Professor of Forest Entomology*

ALFRED AKERMAN, A.B., 1888 (Franklin College of the University of Georgia); M.F., 1902 (Yale)

*Assistant Professor of Forest Engineering*

C. F. CURTIS RILEY, A.B., 1901 (Doane College); B.S., 1905 (Michigan); A.M., 1911 (Doane College); M.S., 1913

(University of Illinois)

*Assistant Professor of Forest Zoology*

CARL CHESWELL FORSAITH, A.B., 1913 (Dartmouth); A.M.,  
1914; Ph. D., 1917 (Harvard)

*Assistant Professor of Wood Technology*

HAROLD CAHILL BELYEA, A.B., 1908 (Mt. Allison University);  
M.F., 1916 (Yale)

*Assistant Professor of Forest Engineering*

J. F. DUBUAR, A.B., 1914; M.S.F., 1915 (Michigan)  
*Assistant Professor of Forestry at the New York State Ranger  
School*

ALLAN F. ARNOLD  
*Instructor in Landscape Engineering*

WILFORD E. SANDERSON, B.S., 1917 (New York State College of  
Forestry)

*Instructor in Forest Extension*

RAYMOND F. HOYLE, B.S., 1917 (New York State College of  
Forestry)

*Instructor in Forest Utilization*

ALVIN G. SMITH, B.S., 1915 (New York State College of Forestry)  
*Field Assistant in Forest Investigations; in Charge of  
Syracuse Forest Experiment Station at Syracuse*

DON M. BENEDICT, B.S., 1917 (Michigan)  
*Teaching Assistant in Botany*

LILLIAN M. LANG  
*Secretary to the Dean*

WALTER W. CHIPMAN, B.S., 1893; A.M., 1904 (Wabash College)  
*Assistant Treasurer*

JOHN W. WEBBER  
*Bookkeeper*

ELEANOR CHURCH, N.L.E., 1916 (Syracuse University)  
*Librarian*

EDNA E. WHITELEY, B.L.E., 1916 (Syracuse University)  
*Recorder*

MEMBERS OF UNIVERSITY FACULTY, OUTSIDE OF COLLEGE  
OF FORESTRY, GIVING INSTRUCTION  
TO STUDENTS IN FORESTRY

FRANKLIN JAMES HOLZWARTH, Ph. D. (Syracuse)  
*Professor of German*

CHARLES W. CABEEN, Docteur de l'Universite (Grenoble)  
*Professor of Romance Languages*

ARTHUR SAYLES PATTERSON, Docteur de l'Universite  
(Grenoble)  
*Professor of Romance Languages*

THOMAS CRAMER HOPKINS, Ph. D. (University of Chicago)  
*Professor of Geology*

WILLIAM L. BRAY, Ph. D. (University of Chicago)  
*Professor of Botany*

EARL EVELYN SPERRY, Ph. D. (Columbia)  
*Professor of History*

WARREN GARDNER BULLARD, Ph.D. (Clark University)  
*Professor of Mathematics*

FREDERICK WILLIAM REVELS, B.A. (Syracuse)  
*Professor of Architecture*

ROSS A. BAKER, Ph.D. (Wisconsin)  
*Professor of Chemistry*

CHARLES JULIUS KULLMER, Ph.D. (University of Tubingen)  
*Professor of German*

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*Professor of Economics*

J. HERMAN WHARTON, A.M. (Syracuse)  
*Associate Professor of English*

FLOYD FISKE DECKER, Ph.D. (Syracuse)  
*Associate Professor of Mathematics*

WILLIAM JOHN GORSE, A.M. (Syracuse)  
*Associate Professor of German*

HARRY N. EATON, Ph.D. (Harvard)  
*Associate Professor of Geology*

JOHN JOSEPH HOPFIELD, A.B. (Syracuse)  
*Instructor in Physics*

ARNOLD A. WHITEHOUSE (Springfield Y. M. C. A. College)  
*Instructor in Physical Education*



# NEW YORK STATE COLLEGE OF FORESTRY

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The act which created The New York State College of Forestry at Syracuse University obligates the College to carry on two important and co-ordinate lines of work; first it is to undertake such special research and state-wide investigation in Forestry as will throw light upon and help in the solution of Forest problems which are now confronting the State and the people of New York; second, it is the Institution for educational work in Forestry in the State.

## THE PROFESSION OF FORESTRY

The first school of forestry in this country was established in 1898. The course of training at first was general in character and the silviculturist—the man who produced the forest tree crop, was the finished product.

With the rapid development of the National Forest policy, the expanding Forest Service demanded silvicultural executives, technically trained men who could supervise timber sales, handle the office routine of free use, grazing permits, etc. The Forest Service being at the time practically the sole employer of technical foresters in this country, its needs largely molded the educational policy of the forest schools. Owing to the heavy demand for men with forest training, new schools were established and forestry courses, really scarcely more than synoptic in their scope, were given at many agricultural colleges. The training in all followed the same line—silviculture—the art of timber production, forming the bulk of the curriculum.

After a few years the demand for silviculturists lessened, the Forest Service having largely filled its quota. The schools, however, continued to turn out the same kind of foresters and, as a consequence, the supply exceeded the demand. The case was similar to the situation which would obtain were every engineering school in the country to turn out nothing except Civil Engineers. An oversupply would be created, while mining, electrical, chemical engineers, etc., could not be obtained.

Of recent years, foresters and economists have experienced a new vision. While the growing of the tree crop is naturally fundamental, the permanent prosperity of the country at large and of the

manufacturers dependable upon the forest for their raw materials, depends also upon the efficient and economical utilization and distribution of the products of the forest. Indeed, in some portions of the country where heavy stocks of timber are now found, questions of forest finance, wood utilization and the economical merchandising of the finished products are at present paramount to crop production.

Then, too, other ways in which the forests may be utilized have come more and more to be recognized as legitimate phases of forestry. In addition to the function of producing timber crops, the public is using the forests to an increasing degree as places of rest and recreation, for hunting and fishing, and as a means of increased food production from grazing animals, fish and game. In order that they may produce to their maximum, the woodlands require the care of the trained forester who, in addition to his knowledge of silviculture, also is thoroughly conversant with methods of preventing and controlling injurious insects and fungus diseases, and who has a knowledge of wild life and the principles of park management. Intimately connected with this is the training of men for work in the National Park Service, which seems destined to a parallel development to that of the Forest Service. The training of such men should include a fundamental knowledge of silviculture, forest protection (including not only protection against fire, but also against insect and fungus enemies), wild life, including fish and game, and fur bearing animals, landscape engineering, architecture and park administration.

Not only are the forests recognized today as having a great aesthetic value because of their recreational use, but the individual trees as used in our streets and highways, our city parks and our home grounds have a part to perform in human service differing only in degree from the trees of the forest or park reservation. The selection, design, care and control of such urban tree planting requires men with training in arboriculture and landscape architecture as well as in such branches of forestry as silviculture and dendrology. Men with such training form the material from which the modern city foresters are made.

From the above brief description of the development of the forestry profession in this country it can be readily seen that the field has broadened enormously. Just as its sister art—agriculture—has been expanded to include animal husbandry, dairying, etc., as well as the tillage of the soil, so does the broad field of forestry comprise not only the production of timber but its utilization. Consequently, the manufacture and seasoning of lumber, the manufacture of paper

pulp, the distillation of wood, in short, the production and proper utilization of all crops, whether animal or vegetable, which the forest areas yield, come legitimately within the forester's realm.

From this sort of evidence it is apparent that the day of the forestry specialist is here. No longer will a single, broad, general curriculum suffice except as a foundation. The country today calls for college men who have the laboratory and practical training necessary to solve the problems which confront the producer and consumer of all forest products. It is to meet these new conditions that the New York State College of Forestry has shaped its course of instruction.

Consequently the horizon of the forestry student is constantly advancing. If during the first years of College training no particular aptitude appears, the regular course, closely akin to a general scientific course, including silviculture, dendrology, forest surveying, etc., may be followed and the period for specializing may be confined to the fifth year. On account of the need of thorough training the College does not consider its graduates technical foresters until they have completed the five years' work and have received the Master's degree. In all cases, a period of apprenticeship must be undergone after graduation to become thoroughly skilled in the application of this training, for the four-year man is ordinarily but a mere beginner.

To men of executive ability, the field is broad. Logging specialists, forest engineers, surveyors and estimators, managers of public and private forests and parks—all are needed. Such lines of work appeal to men fond of a stirring life. Men with business ability will find openings of a managerial nature, while men endowed with the proper temperament will find in salesmanship, used in its broadest sense, a splendid outlet for their talents. With the financial situation which will eventually confront us after the war, the forest actuary or the financial expert, skilled in traffic and tariffs on forest products, export and credit, and other phases of forest economics and business, all will find the growing lumber industry holding forth promise to him.

To men whose tastes are along lines of Natural History and who love a life in the outdoors, certain scientific phases of forestry offer opportunities equally rich. The practical importance of forestry entomology and forest pathology is only beginning to be realized but with the inevitable development of more intensive forestry, the need for men capable of undertaking investigation and control work along these lines will certainly increase. The forest is a community comprising both plant and animal life and fire is by no means the

only agency which can wipe out vast areas of valuable timber. The recent rapid spread of such fungus diseases as the Chestnut Blight and the White Pine Blister Rust, as well as the depredations of such insects as the Gypsy and Brown-tail Moth, the Hickory Bark Beetle, the White Pine Weevil, and of still more serious enemies in the West, suggest the great value, both scientific and economic, of men well trained in these lines. Fish and game have in the past been valued for the sport and recreation they furnished. Recent developments prove conclusively that the lakes and streams in our forest areas are capable of producing enormous quantities of food. Trained managers and investigators of this aspect of forest life are needed in increasing numbers. As an indication of the increasing impor-



THE SOPHOMORE CAMP AT CRANBERRY LAKE IN THE  
ADIRONDACKS.

At the end of the Sophomore year, every student is required to spend three months at the Sophomore Summer Camp on Cranberry Lake in the Adirondacks. Timber Estimating, Surveying, Forest Entomology and Forest Pathology are taken up both in the classroom and in the field. The life in the open, accompanied by vigorous work and recreation, wholesome food, and the companionship of men trained in woodcraft assist greatly in laying an excellent foundation for the final years of instruction in forestry. The above photograph shows a portion of the Summer Camp.



tance of our animal life, it might be mentioned that the Forest Service now gives its employees supervision over fish and game as well as over timber products.

The strength, structure, seasoning and staining qualities of the various species of wood must be ascertained with more accuracy in order that the right species may be used for a given purpose. Steel and concrete have to a considerable degree replaced wood in construction and manufacture largely because lumber products have been sold on a hit or miss plan, without knowledge of the relative value of their structure, resistance, finishing qualities, etc. The only way to prevent further unwise substitution of other materials for wood and wood products is for the men who handle them to know exactly what their qualities are. The Eastern Forest Products Laboratories established in the basement of the new College Building are intended to supply this type of information.

By every token, the day of the forest specialist has come and there is place in the profession for the administrator, for the man interested in any of the various biological problems of the forest community, for the chemist and for those interested in all other phases of utilization. Each has his field and the combined work of all types of men is needed in order that the broad science and art of forestry may develop and yield its maximum service to the State and Nation. No nation can permanently prosper whose land problem is only partially solved. Since Agriculture attempts only the solution of the problems relative to that portion which can be tilled, Forestry, the art of raising and utilizing repeated crops of forest products from soils unsuited to tillage, must assist agriculture in assuring the full and proper use of our land resources.

## INVESTIGATION AND DEMONSTRATION

In meeting the first obligation of the College of Forestry, that is, the carrying on of research and state-wide investigation in Forestry, two small adjacent farms south of the city were purchased in the spring of 1912 and these have been consolidated and designated as The State Forest Experiment Station. Experimental work was begun at this Station in the spring of 1912 and there are growing at present over a million and a half of tree seedlings and transplants as experimental plantings. These have been put out to aid in definite lines of research and it is believed will mean much in determining more definitely as to proper methods of producing, transplanting and final planting of tree seedlings in this State. The College operates on this Station a State Forest Nursery for the growing of a large number of seedlings for its experimental work and for distribution to schools for planting. The operation of this

well equipped Forest Nursery at the Station is of great educational value to the students of the College.

The gift of 1,800 acres of land in the Adirondacks and 100 acres in the Catskills to the University for Forestry purposes adds greatly to the facilities of the College for the carrying on of very definite lines of experimental and demonstrational work. In 1913 the College purchased 1,016 acres of cut-over land in Cattaraugus County and 113 acres in Madison County. These two Forest Stations are located directly adjacent to important lines of railway and have very great value for demonstrational and experimental purposes. It is believed that the work now under way on these various Forest Stations will go far towards solving questions involved in reforestation of idle lands and will help very materially in deciding as to the best methods of handling of timber lands in every section of the State. Manifestly such facilities as these various pieces of land offer will be of great value in the work of instruction.

In addition to the facilities above mentioned for work in forest production (silviculture) and the sciences allied thereto, the College is offering special opportunities for work along forest utilization, believing that the right use of the forest crop is almost as important as its production. In this connection it has entered into formal co-operation with a large chemical firm interested in the manufacture of various chemical products which can be obtained from wood, and has, in the course of this co-operation, equipped several laboratories in which methods of utilizing waste products such as sawdust, wood tar, etc., are being investigated. It has also, through the above mentioned co-operation, come into close touch with firms engaged in the distillation of wood, one of which maintains an experimental plant not very far from Syracuse. Thus an intimate association between this industry and the faculty and more advanced students of the College is possible. These co-operations are being handled through the Department of Forest Chemistry of the College, which deals, in its research laboratory and in these plants, with a wide field of problems connected with the problems of the wood-using industries of New York State, particularly those utilizing the waste of various industries. The facilities for advanced instruction, particularly in the training of men for technical work along these lines, are unequaled.

## PLAN AND SCOPE OF INSTRUCTION

Instruction in the field of Forestry proper comprises the following:



1. Lectures and field instruction in historical and economical aspects of Forestry for all students of the University desiring a knowledge of the meaning of Forestry.

2. More extended instruction along these lines to those who desire to prepare themselves to give instruction in Forestry in the Public Schools.

3. Instruction and advice by means of lectures throughout the State before High Schools and Granges and other organizations interested in any way in the conservation of our natural resources; the publication of bulletins and the giving of expert advice on the ground for the benefit of owners of hill lands, of farm woodlots and of timber lands to enable owners to handle these lands so as to make them much more productive than at the present time.

4. Special service to both producers and consumers of forest products such as special market investigations and studies of closer utilization of waste material as may bring producer and consumer together. Co-operative marketing of farm woodlots and development of markets for such by-products of the forest as Christmas trees, burned timber and thinnings from sprout growth, already begun by the College.

5. Training of young men in such practical lines of Forestry work as will fit them to fill subordinate positions in the State and National Service. To do this work effectively, a State Ranger School is in operation on the College Forest at Wanakena, N. Y. In this School men are trained to fill such positions as Guards, Rangers, Forest Estate Managers, Tree Planting Experts and Nursery Foreman. The year of practical work in the State Ranger School does not necessarily lead to the profession of Forestry.

6. The training of professional Foresters for positions of large responsibility in the State and National Service, or as Forest Experts for private Forest work of any kind, or as City Foresters or Arboriculturists.

7. The giving of special technical training to advanced students in Forestry, in Lumbering, Paper and Pulp-making, and other phases of Forest Utilization, in Forest Management, in Dendrological Chemistry, in Forest Entomology, Forest Pathology, Forest Zoology, etc.

8. Realizing that the continued advancement of Forestry must rest upon a firmer scientific basis, the College believes that one of its most important functions will consist in the proper training of men so that they will be competent to carry on independent investigations in the various phases of scientific Forestry and in the allied sciences.

## FACILITIES FOR INSTRUCTION

From its founding in 1911 until 1917 the State College of Forestry was housed in the Lyman Hall of Natural History where the indoor instruction in forestry was given. In 1913 the State of New York appropriated \$250,000 for a Forestry Building on the Campus of Syracuse University. This was completed during the college year of 1916-1917 and occupied by the College during the second semester. This building is one of the best and most effectively equipped Forestry Buildings in the United States.

The College is unusually well equipped with apparatus for laboratory work in Forest Botany, Pathology, Dendrology, Wood Technology, Zoology and Entomology and with instruments for field work in Forest Mensuration and Surveying.

The College has a Forest Library in charge of a graduate librarian and it is being made as complete as possible in literature covering all phases of Forestry and the sciences having a bearing upon forestry. This library, in connection with the State Forest Experiment Stations located south of the city, and the excellent facilities for advanced work offered in the several scientific laboratories of the College should appeal strongly to research students.

A very complete collection of lantern slides illustrating all phases of forestry has been formed. These slides are used both for class work and for the general educational work throughout the State. A considerable quantity of demonstration and museum material has been gathered since the College opened in 1911 and is being placed on exhibit in the Forestry Building. This museum material is made up largely of the leaves and fruit of forest trees; the trunks of native trees; wood-using tools and machinery; a very complete series of panels of commercial woods; exhibits showing various phases of wood utilization, paper making, etc.; fungi and diseases of trees; fish, birds and mammals; forest insects and their work. This Forest Museum will continue to be developed and will not only be of increasing interest but of great educational value.

## FORESTRY NURSERY PRACTICE

The State Forest Experiment Station just south of the city offers unusual advantages for instructional work in forest nursery practice and other phases of silviculture. The well arranged seed beds and nursery rows have a capacity of millions of seedlings per year. These seed beds are planted primarily for experimental purposes and as a result contain a large variety of different stages of growth. Besides these seed beds, experimental areas on which are established forest plantations of different organizations of trees are used for demonstrating what are the best species for planting in Central New York.

Besides the Experimental Nursery, the Station has a woodlot of thirty acres which is used for demonstration purposes in the marking of trees for thinnings and for underplanting. A large proportion of the east section of the Station is in the form of open fields, and as begun in the spring of 1913, students will plant small plots with different species of value for commercial use on wornout and idle lands in Central New York.

## FACILITIES FOR GENERAL FIELD WORK IN FORESTRY

Early in the spring of 1912, 1850 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks was given to the University for Forestry purposes by the Rich Lumber Company of Wanakena, N. Y. This land is very typical of cut-over areas in Northern New York and is splendidly adapted for general Forestry work both for the students of the State Ranger School and for the professional Forestry students. In September,

1912, the State Ranger School was opened on this tract with 16 students and two instructors. The tract is being studied carefully and during 1913 a permanent working plan was made which will be carried out over a long period of time. The School has been designated as a Branch State Weather Station. All of this offers splendid opportunity for the carrying on of research and experimental work. The Sophomore Summer Camp is held each year from June 1 to August 31 on Cranberry Lake.

Early in 1913 a tract of about 100 acres of Forest land and a good house situated along the Roaring Kill near Tannersville, in the Catskill Mountains were given to the University for the use of the State College of Forestry by John R. Strong of New York City. This is especially well fitted for general instructional work as it is covered with a very good stand of hardwoods and conifers which have not been touched since 1889.

After the gift of the forest land in the Catskills for the work of the College, three tracts of land were secured by purchase. The largest of these tracts is a piece of 1016 acres, two hours south of Buffalo in Cattaraugus County and known as the Redhouse Station. The second piece is a tract of 113 acres at Chittenango in Madison County, which was formerly the Experimental Farm of the New York Central Railroad. This Station is known as the Chittenango Forest Station and is used largely for the production of nursery stock and of feed for the horses at the various Stations. The third and most important purchase was two small adjacent farms of a hundred acres just south of Syracuse, lying between South Salina Street and Lafayette Road. This is known as the State Forest Experiment Station and upon it the principal forest nursery of the College is maintained. These various pieces of land upon which practical work in Forestry is carried on offer splendid facilities for instructional work. Every Forestry student is expected to carry through during his course some definite forest operation, working out the plan and carrying through each operation himself. This will give him the right practical training as well as confidence to carry on practical work.

The location of The New York State College of Forestry at Syracuse is especially favorable to the carrying out of both professional training of students and state-wide educational work. All sections of the Adirondacks are easily accessible by rail. Numerous steam and electric lines radiating in every direction from the city lay the entire region of central and northern New York open to the work of the students. There is no better strategic center with respect to solving the Forestry problems which confront the people of the State.

## REQUIREMENTS FOR ADMISSION

Students entering the regular Course leading to a degree must offer 15 units of preparatory work of High School grade. A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. It takes at least two hours of laboratory work to count as one hour of recitation. No candidate is eligible for admission to the professional courses if deficient in more than 1 count of entrance conditions. The following subjects are required for admission to The State College of Forestry:

English (four years)	3 Units
History (American, English, Ancient or Medieval)	1 "
Algebra, Elementary	1 "
Geometry, Plane	1 "
Geometry, Solid	½ "
French, German or Spanish	2 "
Physics	1 "
Science (Chemistry, Physics, Biology, Botany, Physiology, Zoology, Agriculture, etc.)	2 "
Drawing, Freehand or Mechanical	1 "
Elective (History, Language, Mathematics, Sciences, etc.)	2½ "

Latin (2) of the entrance requirements of the College of Liberal Arts may be substituted for one count of Modern Language. In the above list mathematics is not classed as a science.

The College in maintaining a high standard of work believes that satisfactory College work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of Forestry and that there is no short-cut to the profession. The College urges every young man who is considering the study of Forestry to make up his mind to spend all the time necessary for thorough preparation for College work. If young men before entering College could spend a summer or two or a whole year working in a lumber camp or saw mill or in some manufacturing establishment where wood is used, they would be much better prepared for professional work in Forestry.

Freshmen are accepted only at the beginning of the Fall semester. There is no opportunity to enter at midyear except on advanced standing from some other college.



## STATE SCHOLARSHIPS

The State of New York in accordance with chapter 292, Laws of 1913, awards each county annually five scholarships for each assembly district therein. Each scholarship entitles the holder to "one hundred dollars for each year which he is in attendance upon an approved college in this State during a period of four years." The State College of Forestry is an approved College.

Inquiries in regard to State Scholarships should be addressed to the Commissioner of Education, Albany, N. Y.

### UNDERGRADUATE WORK IN THE COLLEGE OF FORESTRY

#### I. THE FOUR-YEAR COURSE IN GENERAL FORESTRY LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

This is essentially a general college course in which the student studies Forestry as his major subject. He should realize that this course must necessarily fall short of the measure of special training necessary for the professional Forestry degree. This course is designed for students who desire a somewhat intimate knowledge of various branches of Forestry for the general satisfaction which such knowledge gives, or for the use they can make of it in a practical way; for those who wish to prepare themselves to teach certain aspects of forestry in the public schools; or for those who after their college course wish to take subordinate positions in lumbering or manufacturing of forest products or subordinate positions in State or National Forest Service. Such students will not be entitled to the designation of Professional Foresters merely upon the completion of the four years course.

Students who at the beginning of the junior year have made an average of 80 per cent or better in their earlier work will be allowed a certain amount of specialization during their junior or senior years.

#### II. THE FOUR-YEAR COURSE IN CITY FORESTRY LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

The universal love of trees and the wide-spread interest in their culture and preservation among city dwellers especially has created a demand for men who understand the propagation, planting and care of trees for city streets, parks and private grounds. The course



in City Forestry is planned to train men to meet this demand. For the first two years the course is the same as that in general forestry. During the third and fourth years special courses in Arboriculture, Landscape Engineering, Pathology and Entomology are given in addition to the fundamental courses in Silviculture required of students in all courses. An unusual amount of practical work in Plane and Topographical Surveying and considerable actual field experience in so-called "Tree Surgery" is also required. In addition to the three months practical work at the Sophomore Summer Camp, six weeks of the junior summer will be devoted to field work in tree pruning and tree improvement work. The course will thus prepare men thoroughly for all lines of city forestry work; and the fundamental forestry courses required by furnishing a thorough grounding in the principles of Forestry, will fit the men to take charge of any piece of real forest land which may be acquired by cities in the future.

### III. A FOUR-YEAR COURSE IN PAPER AND PULP MAKING LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

For a long time European countries have had state-supported schools of paper and pulp making and at the present time in this country many paper-mill superintendents are graduates of one of these European technical schools. As New York leads all of the other states of the Union in the consumption of pulp wood, it would seem only logical that the State College of Forestry should offer opportunities for men to train themselves in the theory and practice of paper making. The State College of Forestry is ideally located for such work as there are some 18 paper mills within twenty miles of Syracuse. The College is easily accessible, also to the Oswego River and the famous Black River district. With the equipment of laboratories of the Eastern Forest Products Laboratory students in this course will have unusual facilities for work. The course as outlined includes three distinct lines of study:

FIRST. *The Proper use of the Forest in Paper Making.* This includes not only the best methods of producing and conserving the forest so as to insure a perpetual supply of raw material but also the very important consideration of the conservation of the water supply so necessary in the transporting of pulp wood and especially in the manufacture of pulp and paper.

SECOND. *A thorough knowledge of Pulp and Paper Making Machinery.* The machinery used in the pulp and paper industry is by

far the heaviest, most specialized and most expensive of any in the wood-using industries. A fundamental and general knowledge of mechanical engineering is needed in the manufacture of paper.

THIRD. *The Chemistry of Paper Making.* Many variations of the sulphite, sulphate and soda processes as well as new chemical processes are being continually developed. The whole field offers unusual opportunities for investigation.

#### IV. THE FIVE-YEAR PROFESSIONAL COURSE LEADING TO THE DEGREE OF MASTER OF FORESTRY

This course is designed to prepare professional Foresters for higher positions of responsibility in the State Service, the National Forest Service and for the position of expert Forester for private concerns. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man must of necessity build his professional training upon a foundation of general culture. It is the unanimous opinion of the leaders in Forestry education and in the development of Forestry policy in this country, that men who expect to follow the profession of Forestry act unwisely if they try to make a short-cut by eliminating the foundation training. The large opportunities awaiting thoroughly trained Foresters fully justify them in devoting the full measure of time advised for preparation. It is expected that every man who takes the four year undergraduate course in the College will go on and complete his fifth year either immediately following the fourth year or after a year or two of practical work.

The fifth year of this five year course is in reality graduate work and subject to the rules governing graduate work in the College of Forestry.

#### V. GRADUATE WORK IN THE COLLEGE OF FORESTRY

Various courses lead to the degrees of Master of Forestry, Master of City Forestry, Master of Science, Doctor of Economics or Doctor of Philosophy. Information regarding the requirements for these degrees will be found on page 41.

#### VI. TRAINING IN THE STATE RANGER SCHOOL

The State Ranger School gives a practical course of one year which trains men very thoroughly for such positions as forest guard,

forest ranger, forest estate manager, tree planting expert and nursery foreman. The work is largely of a practical nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of various methods of logging and lumbering and nursery practice and tree planting. There is a certain amount of theoretical and field work in Botany, Geology, and Soils, Zoology, Entomology and Economics. It is expected that every man will have a reasonable amount of woods experience before entering upon this practical training. It is to be understood that upon completion of the course a man will not be a trained Forester. A certificate is given after completion of a year of satisfactory work in the school and a diploma following a year of satisfactory practice.

## VII. SHORT COURSES IN PAPER AND PULP MANUFACTURE, DRY KILN ENGINEERING AND LUMBER GRADING

There has been a distinct and growing demand for men trained thoroughly in the manufacture of paper and pulp, in dry kiln engineering, and in timber grading. With the demand for the trained expert there has come a demand for the training of the worker in the mill and it is to supply this last demand that the College of Forestry at Syracuse offers short courses in paper and pulp making, dry kiln engineering and timber grading.

The first short course in paper and pulp making was held at the College from April 15th to June 1, 1919. A dozen men were in attendance representing 7 States and the Dominion of Canada. The short courses given this year were something of an experiment for the College but the result has been such that the College will offer annually short courses in the subjects mentioned above. These courses will begin January 15th and continue for two months. Registration and laboratory fees will be \$25.00. This is the only cost of this course except the few books needed, living expenses at Syracuse and travel.

The work given in the short courses will be of such a character as to assist especially the young man beginning work in a paper mill, in a dry kiln or in a lumber yard. It will consist of elementary work in the structure and grading of timber, in elementary chemistry, mechanical drawing and curve plotting, in dry kiln engineering and in lumber grading. Each course will be separate so that the men who come for paper and pulp manufacture will not need to take the work in dry kiln engineering and timber grading



NEW YORK STATE RANGER SCHOOL AT WANAKENA, N. Y.

This school, situated on the inlet of Cranberry Lake in the Adirondacks, gives a year's practical course to men, fitting them for Forest Guards, Rangers and Estate Managers.

unless they wish to do so. To supplement the work as given by the organized Departments of the College, technical men will be brought in from the outside to give a series of talks and demonstrations in their particular lines. Besides these experts there will be given during the period of the short course a special series of evening lectures by well known men in forestry, paper and pulp manufacture, forest chemistry, dry kiln engineering, etc. Special pamphlets describing these various courses will be sent upon request.

## PROGRAM OF COURSES IN GENERAL FORESTRY

### FRESHMAN YEAR

FIRST SEMESTER		SECOND SEMESTER	
	<i>Hours</i>		<i>Hours</i>
1. General Forestry I	2	1. Forest Zoology I	4
2. English I	3	2. English I	3
3. Forest Botany I	4	3. Forest Botany II	4
4. Forest Mathematics I	3	4. Chemistry I	4
5. Chemistry I	4	5. A modern language	3
6. A modern language	3		18
	19		

### SOPHOMORE YEAR

FIRST SEMESTER		SECOND SEMESTER	
	<i>Hours</i>		<i>Hours</i>
1. Geology I	5	1. Forest Botany III	3
2. Silviculture II	3	2. Geology II	3
3. Engineering I or Physics	3	3. Engineering I or Physics	3
4. Wood Technology I	3	4. Wood Technology I	3
5. Engineering II	5	5. Entomology I	4
	19	6. English II	3
			19

SOPHOMORE SUMMER CAMP—FOREST ENGINEERING III. On Cranberry Lake in the Adirondacks, June 1 to August 31. Required of all students. Prerequisites: Silviculture II, Technology I, Engineering I and II, Botany I, II, and III, Entomology I.

### JUNIOR YEAR

FIRST SEMESTER		SECOND SEMESTER	
	<i>Hours</i>		<i>Hours</i>
1. Forest Botany VI	3	1. Forest Economics I	4
2. Wood Technology III	4	2. Silviculture IV	3
3. Forest Entomology II and III	4	3. Forest Utilization I	4
4. Forest Chemistry III	4	4. Forest Economics VII	3
5. Forest Recreation I	3	5. City Forestry I	3
6. English VI	1	6. History II	2
	19		19



<i>Electives</i>	
German V	3
Forest Utilization II	3
Qualitative Analysis	4
Forest Entomology VI	3
Forest Zoology III	3
Wood Technology II	3
Arboriculture I	3
Landscape Engineering II	3
French II	3
Spanish II	3

<i>Electives</i>	
Forest Chemistry III	4
Forest Geology IV	3
Forest Utilization V	1
Forest Engineering V	3
Qualitative Analysis	3
Wood Technology IV	3
Wood Technology V	3
Wood Technology VII	3
Forest Entomology VII	3
Forest Zoology IV	3
Arboriculture I	3
Landscape Engineering II	3

## SENIOR YEAR

FIRST SEMESTER		SECOND SEMESTER	
	<i>Hours</i>		<i>Hours</i>
1. Silviculture V	4	1. Forest Engineering IV	3
2. Forest Engineering VIII	3	2. Silviculture III	3
3. Forest Zoology II	3	3. Silviculture VII	2
4. Forest Economics VI	2	4. Silviculture VIII	3
5. Forest Economics V	3	5. Rhetoric IV	3
<i>Ele</i>	15	<i>Ele</i>	14
<i>Electives</i>		<i>Electives</i>	
Forest Engineering VII	3	Forest Utilization IV	3
Paper and Pulp	3	Forest Utilization VI	3
Industrial Chemistry	3	Paper and Pulp	3
Forest Recreation II	4	Industrial Chemistry	3
Forest Botany VII	4	Wood Technology VI	3
Forest Botany VIII	3	Wood Technology VII	3
Botany XIX (Plant Ecology)	3	Forest Recreation IV	2
Forest Entomology X	8	Forest Botany VIII	5
Forest Zoology V	9	Forest Botany X	6
Landscape Engineering III	4	Range Grazing	2
Landscape Engineering IV	3	Botany XIX (Plant Ecology)	3
Landscape Engineering V	2	Forest Zoology V	3
		Forest Zoology VI	3
		Arboriculture III	2
		Landscape Engineering III	4
		Landscape Engineering V	3

## RULES REGULATING ELECTION OF COURSES

1. All students are required to take the courses as listed for the freshman and sophomore years.

2. Upper classmen who have maintained a general average of 80 per cent or above during the previous two semesters are required to take the following courses as listed below:

1st semester Jr. Yr.—courses 1-4 inclusive: 4 hours free for election

2nd semester Jr. Yr.—courses 1-4 inclusive: 5 hours free for election

1st semester Sr. Yr.—courses 1-4 inclusive: 7 hours free for election

2nd semester Sr. Yr.—courses 1-4 inclusive: 8 hours free for election

Upper classmen maintaining a grade below 80 per cent during the prescribed period are required to take the courses listed below:

1st semester Jr. Yr.—courses 1-6 inclusive, no election

2nd semester Jr. Yr.—courses 1-5 inclusive, 2 hours for election



1st semester Sr. Yr.—courses 1-5 inclusive: 4 hours free for election  
 2nd semester Sr. Yr.—courses 1-5 inclusive: 5 hours free for election

3. Required courses only will appear on the regular schedule. Information relative to courses available for election may be found under the various departmental announcements listed elsewhere in this bulletin, or in consultation with the head of the department in which such courses are offered. Arrangements as to the meeting of elective courses will be made with the instructor in charge.

## DESCRIPTION OF COURSES IN THE COLLEGE OF FORESTRY

NOTE—A numeral following the number of the course indicates the number of credit hours a week. All courses extend through the year unless followed by a Roman numeral, which limits the subject to the semester named.

### *Courses open to all students of the University.*

FORESTRY. I. (a) GENERAL FORESTRY. Three hours. Place of forestry in the life of State and Nation. This is a synoptical course designed to give a general survey of the subject of forestry and other phases of conservation. Not open to students in the State College of Forestry but to all others—I. Professor Stephen.

SILVICULTURE. I. (a) FARM FORESTRY. Three hours. Development and management of the farm woodlot. Problems of reforestation and timber production upon non-agricultural lands, relation of forest growth on idle lands to soil protection, water supply. Utilization of idle lands for the production of wood for local uses. Open to all students of the University except those in the College of Forestry.—II. Professor Stephen.

LANDSCAPE ENGINEERING. I. Two hours. Appreciation of Landscape Architecture. The principles of art which underlie landscape design. The more important historical styles of gardening. The aim of the course is to give a general knowledge of the common but little understood subject of landscape architecture, with an idea of improving the standard of tastes respecting landscape design and to awaken an increased appreciation of the beauty of the landscape as it is found in nature or modified by man. Open to men and women in the University.—II. Professor Cox.

## DEPARTMENT OF SILVICULTURE

DOCTOR HUGH P. BAKER, DEAN AND PROFESSOR OF SILVICULTURE,

JOHN W. STEPHEN, PROFESSOR OF SILVICULTURE, REUBEN P.

PRICHARD, ASSISTANT PROFESSOR OF SILVICULTURE

I. 2. ELEMENTARY FORESTRY. Two hours lecture. A synoptical course covering general principles of forestry and its relation to

the broad subject of conservation. This course is an introduction to the professional courses in forestry and touches briefly on the more important subjects covered later in silviculture, management, lumbering, utilization and technology.—I. Dr. Baker and heads of departments.

I. (a) 3. FARM FORESTRY. Elective. Three hours lecture. Development and management of the farm woodlot. Problems of reforestation and timber production upon non-agricultural lands, relation of forest growth on idle lands to soil protection, water supply, utilization of idle lands for the production of wood for local uses.—II. Professor Stephen.

II. 4. ELEMENTARY SILVICULTURE. Three hours lecture. Four hours laboratory. Effect of environment on tree development, the forest as a society, the effect of the forest on plants, of moist conditions within and without the forest and the effects of forests on temperature, soil, ground cover. The light relations of the forest, the struggle for existence among trees, mutual injuries and benefits. The silvicultural characteristics of different stands, pure, mixed, seedling, coppice, even and uneven aged. The life history of the forest.—I. Professor Stephen.

III. 2. TREE CHARACTERISTICS. One hour lecture. Two hours laboratory. A study of the economically important species of the United States covering size, range, site requirements, growth and related phases of reproduction, protection and value in the industry.—II. Professor Prichard.

IV. 4. SEEDING AND PLANTING. Three hours lecture. Four hours laboratory. Forest tree seeds, their production, collection and storage. The forest nursery, its location, establishment, development of seed and transplant beds. Sowing, germination and care; lifting, packing, shipping of tree stock; sowing and planting in the field; direct and broadcast sowing and planting; sowing and planting for special purposes and in specified regions. Propagation by other means than seed.—I. Professor Stephen.

V. 4. SILVICULTURAL SYSTEMS. Three hours lecture. Eight hours field. Methods of reproduction of forests as bearing upon silvicultural systems used in this country and abroad. Practice of silviculture, brief review of silvicultural characteristics of more important trees with special reference to the adaptability to management. Systems of thinning involved in management.—I. Professor Stephen.

VI. ADVANCED SILVICULTURAL PRACTICE. Elective. Two hours lecture. Special problems in the practice of silviculture in this country and abroad. Research carried on in connection with local

forest problems, plans for silvicultural management which are carried out as actual problems.—I. Professor Moon.

VII. 4. FOREST PROTECTION. Two hours lecture. Protection of forests from fire, wind, frost, animals and other destructive agencies. Special attention paid to methods of fire detection, control and prevention. Other aspects of forest protection are taken up under forest pathology and entomology.—II. Professor Henderson.

VIII. 4. SEMINAR. Two hours conference. Informal discussion of special problems in forestry. Students are required to prepare and present papers on forestry subjects, especially those related directly to silviculture and management.—I. Professor McCarthy.

## DEPARTMENT OF WOOD TECHNOLOGY

DOCTOR HARRY P. BROWN, PROFESSOR OF WOOD TECHNOLOGY

DOCTOR C. C. FORSAITH, ASSISTANT PROFESSOR OF WOOD TECHNOLOGY

I. 3. ELEMENTARY DENDROLOGY. One hour lecture, four hours laboratory. Studies in the Identification and Taxonomy of Woody Plants with especial stress on the arborescent species native to New York State and the other important forest regions of the United States. Important exotics planted locally in the state. Comparative studies of trees in the summer and winter condition. Lectures supplemented by field and laboratory work. Complete silvicultural study of one local species with phenological observations on this species is required by each student—I. and II. Doctor Forsaith.

II. 3. ORNAMENTAL WOODY PLANTS. One hour lecture, four hours lab. The Identification and Taxonomy of ornamental woody plants. Woody plants of park, street, and private estate are studied from the systematic standpoint. Stress is placed on the identification of woody plants through the use of keys. Lectures supplemented by field and laboratory work. (Prerequisite—Wood Technology I). I. Doctor Brown.

III. 4. WOOD TECHNOLOGY. Two hours lecture, four hours lab. A study of structural, physical, and chemical properties of woods. Identification of woods by gross and microscopic structure. Commercial woods, their source and supply. Uses of woods as affected by anatomical, physical and chemical properties. Class and laboratory work supplemented by work in local lumber yards. (Prerequisite—Wood Technology I). 1. Doctor Brown.

IV. 3. ADVANCED WOOD TECHNOLOGY. One hour lecture, four hours lab. An evolutionary and practical study of prehistoric and modern woody plants. Origin and development of the vascular stele

and their bearing on modern wood. The anatomical features of modern woods in relation to primitive tissues. Lectures supplemented by laboratory and oral review. (Prerequisites—Wood Technology I and III).—II. Doctor Forsaith.

V. 3. TEXTILE FIBRES. One hour lecture, four hours laboratory. Taxonomic survey of the textile fibres of commerce, including botanical source, supply, treatment, microscopic identification, etc. Physical and chemical properties of fibres in their relation to the trade. Microscopy of fibre study. (Prerequisites—Technology I and III).—II. Doctor Brown.

VI. THE MICROTECHNIQUE OF WOODY TISSUES. One hour lecture, four hours laboratory. Preparation of wood for sectioning. The use of microtomes. Stains and staining. Preparation of temporary and permanent microscopic mounts. Photomicrography. (Prerequisite—Wood Technology I and III).—II. Doctor Brown.

VII. 3. WOOD PRESERVATION. Two hours lecture and field trips. Agents of deterioration in wood. Wood preservatives. Methods of treatment with preservatives including "superficial" and "pressure" processes. Wood anatomy in its relation to infiltration. History of wood preservation. Lectures supplemented by trips to wood preserving plants and field observations on treated timber. (Prerequisites—Wood Technology I and III).—II. Doctor Brown.

VIII. RESEARCH IN DENDROLOGY AND WOOD TECHNOLOGY. Elective for graduates. Hours to be arranged. Research problems in various phases of Dendrology and Wood Technology will be assigned to students showing special aptitude for investigative work. Doctors Brown and Forsaith.

## DEPARTMENT OF FOREST ENGINEERING

\* FREDERICK FRANKLIN MOON, PROFESSOR OF FOREST ENGINEERING,  
ALFRED AKERMAN, ASSISTANT PROFESSOR OF FOREST ENGINEERING,  
HAROLD CAHILL BELYEA, ASSISTANT PROFESSOR  
OF FOREST ENGINEERING

I. 3. PLANE SURVEYING. One hour lecture. Four hours field work. A preliminary course in the use of instruments including the compass, hand level, transit and level; topographic surveying, lettering and mapping; calculation of areas.—I or II. Professor Akerman. This course is a prerequisite for the Sophomore Summer Camp.

II. 4. FOREST MENSURATION. Three hours lecture. Eight hours field work. A study of the measurement of trees and forests. Vol-

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\* On leave of absence.



ume of felled and standing trees; estimating and mapping timber, stem analysis of felled trees made to determine the rate of increase in height, diameter and volume. In addition to lectures and textbook, one full day a week is given to field practice.—I. Professor Moon.

III. SUMMER CAMP. Three months practical work in Summer Camp on Cranberry Lake at close of Sophomore Year, June 1 to August 31. Required of all Forestry students before graduation. Field work in plane and topographical Surveying, Mensuration, Field Methods, Utilization, Plant and Animal Ecology, Pathology, Entomology. Prerequisites: Silviculture II, Technology I, Engineering I and II, Botany I and II, Entomology I.

IV. 4. FOREST ENGINEERING. Three hours lecture. Eight hours field work. Construction and use of forest roads, trails, telephone lines, fire towers, bridges, cabins and other features of Engineering and improvement work involved in forest practice. Particular attention paid to use of roads, trails, telephone lines in State and National forest work.—II. Professor Akerman.

V. TOPOGRAPHICAL SURVEYING. Elective. Hours to be arranged. Advanced course in surveying with special attention to field sketching and the making of topographical maps, base line measurements, transit and stadia, forest topography, practice in earthwork computation.—I. Prerequisites: Forest Engineering I and II and Summer Camp.

VI. PARK AND CITY SURVEYING. Elective. Four hours field work. This course is designed for students in city forestry and will have to do with the laying out of streets, private and public grounds and parks.—II. Professor Akerman.

VII. FOREST HYDROGRAPHY. Elective. Hours to be arranged. Relation of forest to rainfall and run-off; problems in stream gauging, current meters, water power sites, water power installation and problems.—II. Professor Akerman. Prerequisites: Engineering I and II, and Sophomore Summer Camp.

VIII. 3. MANAGEMENT. Elective. Three hours lecture. Factors of finance which enter into the practice of forest management in this country and abroad. Regulation of yield of the forest. Students will be given practice in gathering of data and preparation of working plans for forest tracts.—I and II. Professor Moon.

IX. 2. NATIONAL FOREST PRACTICE. Elective. Two hours lecture. A brief history of National forest policy in this country, organization of the National Forest Service. The work of a typical National forest, including fire protection, timber sales, special use privileges;

grazing; handling of claims and entries under Act of June 11, 1906 and other public land laws.—I. Professor McCarthy.

## DEPARTMENT OF FOREST UTILIZATION

\*NELSON C. BROWN, PROFESSOR OF FOREST UTILIZATION, EDWARD

F. MCCARTHY, PROFESSOR OF FOREST UTILIZATION, H. L.

HENDERSON, ASSISTANT PROFESSOR OF FOREST

UTILIZATION, R. J. HOYLE, INSTRUCTOR IN

FOREST UTILIZATION

I. 4. LUMBERING. Four hours lecture. History and development of the lumber industry and the relation between the industry and forestry. Detailed studies of methods and costs of logging, transportation and milling. Study of typical operations in different yards and milling operations. Utilization V supplements this course and is required of all Seniors taking Utilization I.—I. Professor McCarthy.

II. 1. PORTABLE MILLING AND WOODLOT LOGGING. Elective. One hour. The principles and practice of portable mill work and intensive logging and utilization. Logging plans for small woodlots and portable mill jobs. Lectures supplemented by field trips.—II. Professor Henderson.

III. 3. CURRENT PROBLEMS IN THE LUMBER INDUSTRY. Elective. Three hours lecture. A review of particular problems affecting the marketing of lumber. Special attention paid to questions of grading, inspection, selling, distribution, freight rates. Substitutes for wood considered in relation to forest utilization. The export trade and work of lumber associations.—II. Professor McCarthy.

IV. 3. MINOR FOREST PRODUCTS. Elective. Three hours lecture. A study of the so-called minor forest products such as veneer production, paper pulp, cooperage, maple sugar, wood distillation, naval stores, tanning and all other minor products of the forest not included in the manufacture of lumber. Special attention is paid to the utilization of waste material in milling operations and the development of new lines of utilization. Several trips are made to interesting operations in Syracuse and Central New York.—II. Professor McCarthy.

V. 4. FIELD LUMBER STUDY. Following the prerequisite course in Utilization I, a trip of two weeks to a month's duration is taken either individually or in a party to study the methods of logging and lumber manufacture in a region other than the Adirondack spruce region, which is covered in Sophomore Camp. Detail report following a prepared outline is made.—I. Professor Henderson.

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\* On leave of absence.



VI. 3. REGIONAL STUDIES IN LOGGING AND MILLING. Elective. Three hours. A detail study will be made to supplement elementary course in Lumbering, Utilization I, paying particular attention to the local problems and methods pursued in the lumber industry in the Northeast, the Lake States, the Southern Pineries, the Southern Appalachians, the Rocky Mountains, the California Yellow Pine, Sugar Pine and Redwood districts and the Oregon-Washington Douglas fir district.—II. Professor McCarthy.

VII. 3. DRY KILN ENGINEERING. One hour lecture and four hours laboratory. Consisting of a study of the theoretical and practical application of kiln drying of wood products. Kiln design, types of commercial kilns and their operation. Practice in running the College kiln, in making tests for moisture content, humidity and circulation, in making records of drying operations and visits to kilns in Syracuse.—I. Professor Henderson.

## DEPARTMENT OF FOREST BOTANY

DOCTOR L. H. PENNINGTON, PROFESSOR OF FOREST BOTANY, DOCTOR  
A. H. W. POVAH, ASSISTANT PROFESSOR OF FOREST BOTANY,  
DON M. BENEDICT, TEACHING ASSISTANT IN FOREST  
BOTANY, J. ELTON LODEWICK, LABORATORY  
ASSISTANT IN FOREST BOTANY

*Courses I, II, III, IV required of undergraduates.*

*Courses VII, VIII, IX elective for graduates or undergraduates.*

*Course XI for graduates only.*

Students who wish to take special work in Forest Pathology should elect Course VII, the first semester of the junior year.

I. 4. FOREST BOTANY. Two hours lecture. Four hours laboratory. An elementary course throughout the first year dealing with structure and functions of plants and the fundamental problems of Botany, together with a general survey of the plant kingdom as exemplified by a study of representatives of the principal groups from the simplest unicellular forms to the most highly differentiated seed plants. Especial attention is given to the classification of seed plants.—I. Doctor Pennington, Doctor Povah, Mr. Benedict and Mr. Lodewick.

II. 4. FOREST BOTANY. A continuation of Forest Botany, I. under which is given a description of the course.—II. Doctor Pennington, Doctor Povah, Mr. Benedict and Mr. Lodewick.

III. 3. PLANT PHYSIOLOGY. Two hours lecture and recitations. Two hours laboratory. A course designed to teach, largely by experiments, the fundamental physiological processes involved in the nutrition, growth and reproduction of plants. Especial attention

is given to the behavior of plants in relation to light, heat, soil and water conditions.—II. Doctor Pennington. Prerequisites: Courses I and II.

VI. 3. FOREST PATHOLOGY. One hour lecture. Four hours laboratory. A course of lectures, textbook and laboratory work upon the diseases of plants in general with especial emphasis upon diseases of trees. Considerable attention will be given to decay of timber, pathological histology and disease control.—I. Doctor Pennington. Prerequisites: Courses I, II and III.

VII. 3. GENERAL MYCOLOGY. Elective. One hour lecture. Four to six hours laboratory. A course consisting of lectures and laboratory work upon a systematic study of the structure and life histories of fungi. Although representatives of all the principal families will be studied, special attention will be given to forest fungi.—I. Doctor Povah. Prerequisites: Courses I, II and III.

VIII. 3. ADVANCED FOREST PATHOLOGY. Elective. One hour lecture. Four hours laboratory. A course consisting of laboratory work, lectures, reports and conferences upon the more important phases and problems of forest pathology. In the laboratory considerable attention will be given to the technique involved in the isolation and cultivation of pathogenic fungi.—I and II. Doctor Pennington. Prerequisites: Courses VI and VII.

IX. 3. CULTURE METHODS. Elective. Six hours laboratory and conference. A study of technique in the isolation and pure culture of fungi, with especial reference to the life history of certain pathogens of the forest.—II. Doctor Povah. Prerequisites: Courses VI and VIII.

XI. RESEARCH IN FOREST BOTANY. Elective for graduates. Hours to be arranged. Provision is made for properly qualified students to undertake problems in various phases of Forest Botany, as Pathology, Physiology, Ecology, Histology, and Range and Grazing.—I and II. Doctors Bray, Pennington and Povah.

## DEPARTMENT OF FOREST ENTOMOLOGY

\*DOCTOR M. W. BLACKMAN, PROFESSOR OF FOREST ENTOMOLOGY, CARL J. DRAKE, ASSISTANT PROFESSOR OF FOREST ENTOMOLOGY

*Courses I and II are required of all undergraduates in the course in regular Forestry.*

*Courses I and III are required of all undergraduates in the course in City Forestry.*

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\*On leave of absence.

*Courses VI, VII, VIII, IX and X may be taken either as special undergraduate work or as minors in the graduate courses.*

*Course XI can be taken only as major graduate work.*

I. 4. ELEMENTARY ENTOMOLOGY. Two hours recitation. Four hours laboratory. A general course devoted to the study of the morphology, life histories and general classification of insects. Designed as an introduction to advanced work and to work in economic Forest Entomology.—II. Doctor Blackman, Professor Drake and Assistants. Forest Zoölogy I is prerequisite for this course.

II. 4. FOREST ENTOMOLOGY. Two hours lecture. Four hours laboratory. Devoted to a study of those insects sustaining intimate relations to economic problems of Forestry. This course includes study in the laboratory and in the field of the morphology, classification, life histories and habits of both beneficial and injurious insects and methods of controlling the latter.—I. Doctor Blackman and Assistants. Course I is prerequisite.

III. 3. INSECTS AFFECTING SHADE TREES AND ORNAMENTAL SHRUBS. Two hours lecture. Two hours laboratory. A study of the morphology, life histories and habits of insects affecting ornamental trees and shrubs, with methods of combatting them. Intended primarily for students specializing in City Forestry.—I. Professor Drake. Course I is prerequisite.

VI. 3. ADVANCED FOREST ENTOMOLOGY. Elective. One hour conference. Four hours laboratory or field. Consisting of laboratory work, field work and library investigation. The field work is planned to give practical instruction and practice in locating, studying and preparing reports upon infestations of forest insects. Each student will be assigned certain subjects for library investigations upon which he will report and lead the discussion at the weekly conference.—I or II. Doctor Blackman. Courses I and II are prerequisite.

VII. INSECT ANATOMY. Elective. Hours to be arranged. A more detailed study of the anatomy of certain insects not studied in previous courses. Doctor Blackman and Professor Drake.

VIII. INSECT TAXONOMY. Elective. Hours to be arranged. A more detailed study of the classification of some particular group of insects. Dr. Blackman and Professor Drake.

IX. INSECT HISTOLOGY. Elective. Hours to be arranged. Consisting of practice in the methods of preparation of insect tissues and a careful microscopic study of the tissues and organs of insects. Doctor Blackman.

X. PROBLEMS IN FOREST ENTOMOLOGY. Elective. Hours to be arranged. Individual study of small problems in forest entomology. Intended to serve as training and practice in the investigation of technical problems.—I or II. Doctor Blackman and Professor Drake.

XI. RESEARCH PROBLEMS IN FOREST ENTOMOLOGY. Elective. For graduate students. Hours to be arranged. Research problems in various phases of forest entomology will be assigned to students possessing the proper training and qualifications for independent original investigation.—I and II. Doctor Blackman and Professor Drake.

## DEPARTMENT OF FOREST ZOOLOGY

DOCTOR C. C. ADAMS, PROFESSOR OF FOREST ZOOLOGY

C. F. CURTIS RILEY, ASSISTANT PROFESSOR OF FOREST ZOOLOGY

*Zoology I is required of all Freshmen.*

*Zoology II, II., IV, V, VII and VIII are open to Seniors.*

*Zoology IX is open only to Graduates.*

*Zoology V is open to all students of the University.*

These courses are designed as a training in the scientific principles underlying the relation of animals to forest lands and waters, and national parks, and the application of these principles to the economic and social problems concerned with birds, fish, game, fur-bearing and other forest animals.

I. 4. GENERAL ZOOLOGY... Two hours recitation. Four hours laboratory. A course in general principles of Zoology. The work consists of laboratory and field study of animals, together with lectures and recitations upon the physiology, anatomy and ecology of the forms studied and a discussion of the general problems involved.—II. Professor Riley and Assistants.

II. 3. FISH AND GAME. One hour lecture. Four hours laboratory or field. A course devoted primarily to a study of the more common fish, game and forest animals, including their propagation, their protection and their relation to the utilization of forest lands and parks—I. Doctor Adams and Assistant. Prerequisite: Zoology I or equivalent and Entomology I.

III. 3. ECOLOGY OF FRESH WATER ANIMALS. Elective. One hour lecture. Four hours laboratory or field. This course is intended to give a scientific foundation for the application of animal ecology to the aquatic life of the lakes and streams of forest lands and parks. Special emphasis is placed upon methods of investigation so as to make the work preliminary to the study of the problems concerned with the utilization of the aquatic resources of forest lands and



parks. It is particularly useful to those interested in fish, fish culture and allied problems. Doctor Adams. Prerequisite: Zoology I.

IV. ECOLOGY OF FOREST ANIMALS. Elective. One hour lecture. Four hours laboratory or field. This course is complementary to the preceding and is devoted to a training in the scientific foundations and the application of ecology to the land animals of coniferous and hardwood forests and national parks. This training is intended to prepare the student to understand and investigate the relations of animals to the management of forest lands and parks. Particular emphasis is placed upon upland game birds and mammals, furbearing animals, the relation of birds to woodlands, game vermin, and the relation of animals to forest soils. It is particularly useful to those interested in forest animals, parks, and allied woodland problems. Doctor Adams. Prerequisite: Zoölogy II.

V. 2. HABITS OF BIRDS. Elective. A course devoted to the general habits, behavior and identification of birds, with some attention given to other animals. Consisting of conferences and field excursions for bird study. Intended as an introduction to the study of birds. Of value to teachers of Zoölogy, nature study, and forestry students. Open to all students of the University.—I. Professor Riley.

VI. 2. HABITS OF FOREST ANIMALS. Elective. Two lectures. A course devoted to the habits, emotions, and intelligence of fish and game from the standpoint of their preservation and propagation: including the behavior of animals during the chase, and the habits of grazing animals.—I. Professor Riley.

VII. 3. NATURAL HISTORY OF NATIONAL PARKS AND PRESERVES. Elective. One lecture and four hours in laboratory or field. A study of the theory and practice of the principles underlying the appreciation and care of the natural history resources, mainly animals, of National Parks, State and private wild life preserves. Consisting of lectures, laboratory and field study, and special reports on representative subjects. Intended to train forestry and landscape students in the care of animals in preserves and parks. Open to Juniors and Seniors.—II. Doctor Adams.

VIII. PROBLEMS IN FOREST ZOOLOGY. Elective, hours to be arranged. Individual study of special Zoological problems. Doctor Adams. Prerequisites: Zoology I and II.

IX. ECOLOGICAL RESEARCH IN FOREST ZOOLOGY. Elective to students. Hours to be arranged. Advanced individual investigation for properly qualified students of ecological problems on forest, fish and game animals. Doctor Adams.

## DEPARTMENT OF CITY FORESTRY

LAURIE D. COX, PROFESSOR OF LANDSCAPE ENGINEERING  
ALAN F. ARNOLD, INSTRUCTOR IN LANDSCAPE ENGINEERING

## CITY FORESTRY

I. 3. CITY FORESTRY. Three hours lecture. The growth and maintenance of trees for aesthetic purposes in streets, parks, and woodlands. Landscape forest types, aesthetic cuttings, roads and vistas. A general consideration of the field of arboriculture, tree repair, pruning, and care of trees. The identification and use of a selected list of ornamental trees and shrubs. The theory and principles of Landscape Engineering and City Planning as they relate to tree location in streets, parks, and home grounds.—II.

## ARBORICULTURE

I. 3. PLANT MATERIALS. Two hours lecture. Two hours laboratory. Deciduous and Evergreen shrubs, vines and perennials, their identification and use.—I and II. Professor Cox.

II. 3. PRUNING AND CARE OF TREES. Two hours lecture. Two hours laboratory. Propagation, pruning and planting of ornamental trees, tree surgery, etc.—II. Mr. Arnold.

III. 2. SHADE AND ORNAMENTAL TREES. Two hours lecture. A continuation of Arboriculture I. The identification and use of ornamental trees.—II. Mr. Arnold. Prerequisite: Arboriculture I.

IV. 2. STREET TREE PLANTING. One hour lecture. Three hours laboratory. The selection and planting of street trees and their relation to street design. Plans and reports for street tree planting.—II. Professor Cox.

## LANDSCAPE ENGINEERING

I. 3. THE APPRECIATION OF LANDSCAPE ARCHITECTURE. Two hours lecture. One hour reports, etc. The elements and principles of Landscape design. Lectures and reports.—II. Professor Cox.

Not open to professional students but to all other students of the University.

II. 4. ELEMENTS OF LANDSCAPE ENGINEERING. Two hours lecture. Four hours drafting. Elements and principles of landscape engineering. Lectures and drafting practice.—I and II. Professor Cox and Mr. Arnold.

III. 3. LANDSCAPE ENGINEERING DESIGN. One hour lecture. Six hours drafting, senior year. Elementary design in Municipal Landscape Engineering.—I and II. Professor Cox. Prerequisite: Landscape Engineering II.

IV. 3. LANDSCAPE ENGINEERING CONSTRUCTION. Two hours lecture. Three hours drafting. Highway design and engineering, drainage



and grading problems. I and II. Professor Cox. Prerequisite: Landscape Engineering III.

V. 4. CITY PLANNING. Two hours lecture. Two hours drafting. Street design in its relation to city planning.—I. Professor Cox.

VI. 2. LANDSCAPE ENGINEERING DETAILS. One hour lecture. Three hours drafting. Design of structures used in Municipal Landscape Engineering, retaining walls, fountain steps, pergolas, park and recreation buildings, conservatories, etc.—I. Professor Cox. Prerequisites: Landscape Engineering II and III.

VII. LANDSCAPE ENGINEERING DESIGN. Elective. Advanced landscape engineering. Design for fifth year students.—I and II. Professor Cox.

## DEPARTMENT OF FOREST CHEMISTRY

DR. LOUIS E. WISE, PROFESSOR OF FOREST CHEMISTRY.

I. General Inorganic Chemistry. Given in the Department of Chemistry, College of Liberal Arts. I and II, Professor Baker and instructors.

III. 4. Organic Chemistry. Two hours lecture and four hours laboratory. Two semesters. The course may be elected. This is primarily an elementary course in organic chemistry. Special emphasis will, however, be placed on the chemical wood products, such as acetic acid, acetone, oxalic acid, wood alcohol, etc., and the naturally occurring substances such as the carbohydrates, oils, acids, etc. Prerequisite, Chemistry I. I and II. Dr. Wise.

IV. 2. Chemistry of the Celluloses. Two hours lecture or seminar during the second semester. Lectures will cover researches on the constitution, properties and uses of the celluloses and their derivatives prior to 1910. The lectures will be supplemented by assignments to students covering various phases of the recent chemical literature on the celluloses and their products. This is essentially a graduate course. Prerequisites: General Chemistry, qualitative analysis, quantitative analysis, organic chemistry and a reading knowledge of German. II. Dr. Wise.

IX. 1. Seminar. One hour weekly, both semesters. Reports on recent chemical literature dealing with forest products. I and II. Dr. Wise.

X. Research in Forest Chemistry. Hours to be arranged. Problems in organic chemistry will be assigned to properly qualified graduate students. Prerequisites depend upon the nature of the problem. I and II. Dr. Wise.

## COURSES IN PAPER AND PULP MAKING.

To be arranged. Correspondence with the Department of Forest Chemistry is invited before plans are made to enter this field.

VI. 2. DYESTUFFS. Two hours lecture; one semester. The constitution and synthesis of the most important vegetable and aniline dyestuffs and intermediates. Dr. Acree. Prerequisite: Forest Chemistry II.

VII. 2. The application of quantitative and physical methods to the problems of organic and biological chemistry. Two hours lecture; one semester. Dr. Acree. Prerequisites: Forest Chemistry II, Chemistry X, and a knowledge of calculus.

VIII. 2. Special topics in advanced organic chemistry. Two hours lecture; one semester. Stereochemistry as applied to natural products, terpenes, alkaloids and tannins. Dr. Acree. Prerequisite: Forest Chemistry II.

IX. Research in organic or physical organic chemistry. Hours to be arranged. For students who are candidates for higher degrees. These may select problems connected with the topics mentioned in the lecture courses, provided they bear on the general problems of the department. Research may also be undertaken in the field of work connected with the chemical action of fungi, using the facilities provided by the Bureau of Plant Industry, U. S. Department of Agriculture, through the co-operation previously mentioned. Dr. Acree. Prerequisites to be determined.

X. 2. SEMINAR. Two hours weekly; both semesters. A seminar on topics suggested by the work of the department. Dr. Acree.

#### PAPER AND PULP COURSES

I. 2. PAPER. Two hours lecture. A lecture course on paper, its history, various processes of present day paper making. Elective prerequisite course open to all students.—I.

I. 3. MANUFACTURE OF PAPER. One hour lecture. Four hours laboratory. In this course students study the present-day methods of paper manufacture. Prerequisite course: Paper I, II.

III. 1. PAPER MAKING MACHINERY. One hour lecture. The course is so designed that the student not only studies the construction of the various types of equipment used in the paper mill, but also studies its use in actual operation.—I.

IV. 2. MANUFACTURE OF PULP. Two hours lecture. Lecture course on sulphite, soda, sulphate, and ground wood pulp manufacture. In this course special emphasis is put on the chemistry of the processes. Prerequisite course: Paper I.—I.

IVa. 3. MANUFACTURE OF PULP. Two hours lecture. Four hours laboratory. A continuation of Course IV, in which more advanced problems are studied. Open to juniors, seniors and graduate students.—II.

V. 2. ANALYTICAL METHODS USED IN PAPER MANUFACTURING. Four hours laboratory. Studies of the chemical methods used in controlling different processes, such as size, bleach, lubricants, etc. Prerequisite courses: Paper I, II and IV.—II.

VI. 2. PHYSICAL TESTS USED IN PAPER MANUFACTURE, such as tensile strength, elasticity, crumpling, etc. Prerequisite courses: Paper I, II and IV.—II.

VII. CHEMISTRY INVOLVED IN BLEACHING PULP. Hours to be arranged. Problems will be assigned to students for individual investigation after a systematic study of methods now in use in the pulp manufacturing industry. Open to juniors, seniors and graduates. Prerequisite: Paper I and V.—I and II.

VIII. CHEMISTRY OF DYEING PULP, AND PAPER COLORING. Hours to be arranged. A laboratory course involving a systematic study of the methods used to dye wood fibres and to color paper. Prerequisite: Chemistry V.—I and II.

IX. PAPER MILL MANAGEMENT. Seminar, one hour. Open to seniors and graduate students. Prerequisite courses: Paper V, VI, VII, VIII, Chemistry II.—II.

## DEPARTMENT OF FOREST ECONOMICS

———, PROFESSOR OF ECONOMICS

———, INSTRUCTOR IN ECONOMICS

(Both of the College of Liberal Arts)

I. 3. THE ELEMENTARY PRINCIPLES OF ECONOMICS IN THEIR RELATION TO FORESTRY. Three hours lecture. This course will present those elementary principles of economic science which are essential as an introduction to a more specialized course in forest economics. It will analyze the chief problems connected with the four great economic processes of the production, exchange, distribution and consumption of wealth. The chief topics treated will be: the factors of production, the law of diminishing returns, the cost of production, the division of labor and economic speculation, the concentration of industry, utility value, price competition and monopoly, international trade and its regulation; wages, rent, interest, profits; the standard of living, luxury, welfare, and the relations of the state to economic activity. Lectures, recitations, readings and reports.—I. Mr. ———.

II. 3. THE ECONOMICS OF FORESTRY. Three hours lecture. An opportunity is afforded in this course for a more specialized study of the economics of forestry. The relation of forests to civilization and the proper attitude of society towards forests; the origin and growth

of the conservation movement; the special relation of forests to conservation problems; the economic value of forests, including their value as productive private property; their relation to the conservation of water and public safety, navigation, grazing, recreation, public health, labor; their function as a refuge for game; forest taxation; tariff on lumber; foreign and domestic market conditions; the exploitation of forest products and its effect; the national requirements in the way of forest products; their manufacture and transportation. Lectures, recitations, readings and reports.

—II. Mr. ———.

III. 5. MONEY. CREDIT AND BANKING. Three hours lecture. The nature and functions of money, development of money in the United States, credit and credit currency; types of banking systems; handling checks, drafts and exchange; the Federal Reserve Act.—I. Professor ———.

IV. 3. LABOR PROBLEMS. Elective. Three hours lecture. The laboring classes before the nineteenth century; development of trade unionism in England and America; strikes; collective bargaining and trade agreement; arbitration; machinery and division of labor; unemployment; labor legislation; immigration; profit-sharing; co-operation; the trend of wages; labor politics and labor parties in America and other countries.—I and II. Professor ———.

V. 3. BUSINESS LAW. Three hours lecture. A general survey of subjects more closely connected with the ordinary transactions of business. The purpose of the course is to give the man of affairs a knowledge of the general character and extent of his legal rights and duties.—II. Professor ———.

*Additional Courses in strictly Forestry phases of economics are given by Professor Henderson of the College of Forestry Faculty.*

VI. 2. FOREST LAW. Two hours lecture. The object of this course is to gain a general knowledge of forest law. The Federal Laws, with particular reference to the acquisition of the public domain in the West, will be taken up. The forest laws of the principal states engaged in forestry work will be discussed and studied in detail. Forest taxation, legislation and management of state reserves will also be discussed.—II. Professor Henderson.

VII. 3. FOREST HISTORY. Three hours lecture. The history of European Forestry with application to present conditions existing in the United States; statistical statement of timber production and consumption, import and export and present supply of timber in each of these countries.—I. Professor ———.



## DEPARTMENT OF FOREST RECREATION

HENRY R. FRANCIS, PROFESSOR OF FOREST RECREATION

1. 3. RECREATIONAL USES OF FOREST AREAS. Two hours lecture. Three hours laboratory. A general course to teach the fundamental principles of the public use of forest areas for recreation and the relation of recreation to other forest uses.

The course will be devoted to a study of such subjects as: Land Classification, Area Determination, Structural Arrangement, Development, and Maintenance; Transportation and Communication Systems, Camp Sites, Summer Colonies, and Permanent Communities; Administration Buildings, Forest Museums, Refectories, Hunting and Fishing Regions and Sanctuaries, Playgrounds and other Recreation Facilities, Water Supplies and Sanitation.

This course is designed to develop an appreciation of recreation as one of the major forest utilities, its relation to public service, and to lay a sound foundation for a technical training in Forest Recreation.—I.

II. 4. DEVELOPMENT OF FOREST PARK RECREATIONAL AREAS. Elective. Two hours lecture. Four hours laboratory. This course first takes up the elements of structural design. Later the work involves the application of these principles to the development of national and state parks and forest areas used for recreation.—I and II.

*The following elective courses will be given for the first time in 1920-21:*

III. 3. PROJECTS IN FOREST RECREATION. Elective. One hour lecture. Four hours laboratory. A course taking up a study of some of the common problems in forest recreation and their logical solution. After the student has advanced sufficiently he is given a special project in forest recreation to work out.—I. Prerequisite: Forest Recreation II.

IV. 2. NATIONAL PARK PRACTICE. Elective. Two hours lecture. A brief history of the policies of the National Park Service, the practices governing recreational uses of forest areas, both Federal and State, and the organization of the present National Park Service. A study will be made of a typical National Park, such as the Yellowstone, and of a typical State park, such as the Palisades, Interstate or Letchworth, including such features as accommodating and regulating tourist travel; hotels, public camps, and private camping; concessions; grazing; protection of wild life; prevention of accidents and marking trails; health precautions and sanitation provisions.—II.



V. 3. RESEARCH PROBLEMS IN FOREST RECREATION. Elective. Special research problems will be given to graduate students by arrangement.—I and II.

## COURSES FOR STUDENTS IN THE COLLEGE OF FORESTRY GIVEN BY ACCESSORY INSTRUCTORS

These courses are given by Departments in the College of Liberal Arts, Applied Science and Fine Arts of the University.

### *ENGLISH*

If. 3. ENGLISH. The principles of composition; the sentence; review of punctuation and spelling; the expository paragraph; organization; word study; accuracy; condensation; letter-writing; elements of technical description; long and short themes; class themes; analysis of models; class thesis.—I and II. Required. Professor Wharton, Instructors Wentworth and Hazlett.

III. 3. ENGLISH. Advanced problems in exposition and description, oral and written; study of representative modern essays; business correspondence; lectures; recitations; themes; conferences.—II. Required. Professor Wharton.

Vif. 1. ENGLISH. Weekly interpretative readings in English and American literature, with primary emphasis upon contemporary authors; selections governed by their appeal to men; occasional lectures on the principal literary types; informal discussions.—Required of all Juniors whose general average for the preceding year is below eighty per cent. Elective for other Juniors, and for Seniors who have not taken the course in their junior year.—I and II. Professor Wharton.

### *RHETORIC*

IV. 2. PUBLIC ADDRESS. Lectures, classroom declamations. Addresses for all occasions are written and delivered. Parliamentary drill. Extemporaneous speaking and criticism.—I. Professor Parmenter.

V. 2. ADVANCED PUBLIC ADDRESS. Original orations. Platform etiquette. Hymn and Bible reading.—II. Professor Parmenter.

### *GERMAN*

I. 3. ELEMENTARY COURSE. Grammar. Translation from German into English, and elementary exercises in translating into German. Special emphasis on oral work.—I and II. Dr. Holzwarth and Professor Gorse.

III. 3. GRAMMAR AND READING. Oral work and composition.—I and II. Dr. Holzwarth and Professor Gorse.

V. 3. SCIENTIFIC GERMAN. Intended to furnish drill in the reading of modern scientific German and is recommended to students pursuing courses in the natural sciences.—II. Doctor Kullmer.

### *FRENCH*

I. 3. ELEMENTARY COURSE. Grammar and reading course. Translation from French into English, and elementary exercises in translating into French. Special emphasis is placed on oral work. Three hours through the year.—I and II. Professor Patterson.

II. 3. SCIENTIFIC FRENCH. A reading course designed to meet the needs of students pursuing courses in the natural sciences.—I. Doctor Cabeen.

### *SPANISH*

I. 3. ELEMENTARY COURSE. Grammar and reading. Translations from Spanish into English and elementary exercises in translating into Spanish. A course designed to meet the needs of forestry students who contemplate service in Central and South America. Three hours throughout the year.—I and II. Mr. Crawford.

II. 3. SCIENTIFIC SPANISH. A reading course designed as a sequel to the elementary course in Spanish. Selected reading from modern scientific text.—I. Mr. Crawford.

### *HISTORY*

I. 2. EUROPEAN HISTORY. Recent European History dealing especially with international relations and problems arising from the war. America's position as a world power.—II. Dr. Sperry.

### *MATHEMATICS*

I. 3. TRIGONOMETRY. The solution of triangles with and without logarithms, including the derivation of the necessary formulae; the study of trigonometric functions as functions; the derivation and application of formulae involving the functions of one or more angles; the transformation of expression involving the functions; the solution of trigonometric equations.—I. Professors Bullard and Decker.

II. 3. SOLID GEOMETRY. The study of lines, surfaces and solids with reference to the development of space intuition and the observation and establishment of geometrical properties; numerical application.—II. Professor Decker.

### *BOTANY*

I. 4. RANGE AND GRAZING. Elective. Two hours. Lectures, assigned reading and conferences upon range and grazing problems.—II. Doctor Bray. Prerequisites: Forest Botany I and II.

## CHEMISTRY

I. (a) 3. ELEMENTARY CHEMISTRY. A brief course consisting of two recitations and two laboratory periods per week.—I and II. Professor Baker. Instructors Buell and Phelps.

Once a month an experiment lecture is substituted (Wed. 2 P. M.) for the second recitation of the week.

For the benefit of high school graduates who feel competent to pass an examination in this subject an advanced standing examination will be offered at the time of the September supplementary examination and again September 30, 2 P. M., in Bowne Hall. Certified notebooks must be presented.

## GEOLOGY

I. 5. GENERAL GEOLOGY. Three hours lecture. Four hours laboratory. Lectures, recitations, laboratory and field work.—I. Dr. Hopkins.

II. 3. GEOLOGY OF SOILS. Two hours lecture. Two hours laboratory. Geology of Soils. Water and Fertilizers.—II. Professor Eaton.

IV. 3. FOREST PHYSIOGRAPHY. Two hours lecture. Two hours laboratory.—II. Dr. Hopkins.

## PHYSICS

XXII. 3. GENERAL PHYSICS. Two hours lecture. Two hours laboratory. Lectures, recitations and laboratory work on mechanics and heat.—I and II. Mr. Hopfield.

GRADUATE WORK IN THE COLLEGE  
OF FORESTRY

Graduate work in the College has been planned for the purpose of production of two different types of men—first, the man with a more complete, broad, general training in forestry and, second, the specialist capable of investigating special economic and scientific problems of forestry. The broad, general training is designed to fit men for administrators of state, national or private forests or parks. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man to be successful must build his professional training upon a broad foundation. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting at least five years of study in preparation. For this reason it is strongly urged that every man who takes the four-year undergraduate course in the College return and complete his fifth year either immediately following the fourth year or after a year or two of practical work. Until he does this

the College cannot place the stamp of Forester upon him. The five-year course mentioned leads to the degree of Master of Forestry. Similarly a fifth year spent in advanced work in Landscape Engineering and Arboriculture leads to the degree of Master of City Forestry.

The degree of Doctor of Economics, the requirements for which are given at another place, is designed to appeal particularly to two general classes of men. First—To recent graduates in Forestry whose abilities and tastes lead them to prepare more fully for administrative positions in Colleges, for general educational work along lines of forestry and general conservation, or for administrative work in state or national departments of forestry and parks. Second—It is hoped that the degree will also appeal to men who have made a distinguished success in administrative affairs connected with forestry and who wish to earn an advanced technical degree.

Two of the most important functions of the College are the conducting of investigations in forestry and the proper advanced training of men that they may be competent to undertake investigations. The College of Forestry thoroughly believes that the symmetrical advancement of forestry in the future depends not only on men possessing the broad, general training in forestry but is equally dependent upon the men who in addition to a general knowledge of forestry have specialized in one of its various economic or scientific phases. There are a vast number of technical and scientific problems which must be solved before forestry really comes into its own in this country and such problems can be solved only by the man who has been specially trained in methods of investigation and who is thoroughly conversant with all the previous researches along his particular line. The College of Forestry is, therefore, offering graduate work in all phases of scientific forestry, such as silviculture, dendrology, forest pathology, forest entomology, forest zoology, wood chemistry, etc. These courses are planned for the express purpose of educating technical investigators competent to undertake independent research. The opportunities for advancement, both scientifically and materially, are good and bound to be especially needed in the National Forest Service, in the National Park Service, in the various State Departments of Forestry, in the Forest Experiment Stations and in the various commercial laboratories, as well as in teaching and investigative work in connection with educational institutions.

This graduate work is open not only to graduates of forestry courses but under certain restrictions, mentioned in another place, to men whose undergraduate work has been along other scientific



lines. Two degrees are open to men taking such work—Master of Science and Doctor of Philosophy, the requirements for which are given at another place.

## RULES GOVERNING GRADUATE WORK IN THE COLLEGE OF FORESTRY

### DEGREES OFFERED

The following degrees will be conferred upon the satisfactory completion of approved schedules of courses and of the other requirements:

Master of Forestry, Master of City Forestry, Master of Science, Doctor of Economics and Doctor of Philosophy.

It should be understood that the time requirements mentioned below are minimum requirements only. The College does not obligate itself to grant degrees, except upon the completion of all the work in a manner satisfactory to its faculty. The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.

### MAJORS AND MINORS

At the time of enrolling, the candidate for a degree shall submit a schedule consisting of not more than 15 semester hours in each semester. This schedule shall be distributed between a major of nine semester hours and two minors of three semester hours each. If so desired, both the major and one minor may be taken in one department or both minors may be taken in one department. This schedule must receive the approval of the graduate committee and the Dean.

### REQUIREMENTS FOR THE DEGREE OF MASTER OF FORESTRY

For the successful prosecution of the work the ability to read German at sight is necessary.

For candidates who are graduates of approved courses in technical forestry a minimum of one year of residence work is required. For graduates in other courses a minimum of two years residence work will be necessary.

A thesis or report showing the candidate's ability to complete satisfactorily an investigation upon a topic connected with the candidate's major study must be submitted to the professor in charge not later than May 1 of the year in which the candidate receives his degree. This, if approved by the professor in charge, and if acceptable to the graduate committee is so endorsed and a copy is deposited in the library.



Upon the acceptance of his thesis the candidate will be notified and provided he has satisfactorily passed written examinations in all his courses he will at the same time be instructed when to appear for an oral examination. This examination will be given by the professors under whom the candidate's work has been taken—the Dean or some member of the graduate committee acting as chairman. Any member of the faculty is privileged to be present and to participate. This examination will not take place later than June 1.

#### REQUIREMENTS FOR THE DEGREE OF MASTER OF CITY FORESTRY

A reading knowledge of French is desirable.

For students who are graduates of the course in City Forestry in this College or who have had equivalent courses, a minimum of one complete year of residence work of acceptable grade along approved lines is required.

Similar requirements with regard to thesis and oral examination as for the Master of Forestry degree are in force.

#### REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

For the successful completion of the work, the ability to read German at sight is necessary.

For students who are graduates in forestry of this institution or others of a similar grade, a minimum of one year of residence work of an acceptable grade is desired.

Students who are graduates in lines other than forestry may be recommended for their degree on the completion of one year of satisfactory residence work provided at least one-third of their course work is in forestry courses. *The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.*

Similar requirements are made as regards thesis and oral examinations as for the preceding two degrees.

#### REQUIREMENTS FOR THE DEGREE OF DOCTOR OF ECONOMICS

Candidates must hold either the Bachelor's degree in which Forestry was the major work, the degree of Forest Engineer or the Master's degree in Forestry from a college of approved standing. Before beginning the second year of graduate work the candidate must demonstrate his ability to read German and French at sight.

In case the candidate holds the Bachelor's degree only, a minimum of three years' residence work is required. One year's residence work in graduate work in another college may be substituted at the discretion of the Dean and graduate committee.

In case the candidate holds the degree of Master of Forestry and has in a distinguished manner completed not less than three years of approved administrative work in Forestry the minimum residence requirements shall be one year.

Under no condition shall this degree be granted as an honorary degree, but it shall stand for a certain amount of co-ordinated study along the line of broad problems of economics and administration with special regard to the development of state and national forest policy.

A thesis demonstrating the results of research and original thought upon some phase of forest economics is required. This must be satisfactory to the Dean and the members of the graduating committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the College Library.

The candidate is required to pass two examinations, both oral. The preliminary examination will cover the entire subject of forestry with particular reference to the economic phases. The examination will be upon the candidate's thesis.

#### REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

A candidate must be a graduate of a college of approved standing and his undergraduate standing must have been such as to fit him to pursue advanced work in the subject which he chooses as his major. Before beginning the second year of graduate work the candidate must demonstrate his ability to read scientific German and French at sight.

In case the candidate holds merely the Bachelor's degree a minimum of three years' graduate work is required. One year's residence in graduate work at another college may be substituted with the approval of the Dean and graduate committee.

At the time of enrolling the candidate must choose the major study and two minor studies subject to the same rules as those governing other graduate work. If the candidate is not a graduate in forestry at least one of these minors during two years of his course must be in forestry.

A thesis demonstrating the results of scientific research upon a topic bearing upon his major subject must be completed and receive the approval of the major professor not later than May 1st of the year in which the degree is granted. This must be satisfactory to the Dean and graduate committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the college library.

The candidate is required to pass two examinations, both oral. The preliminary examination will be upon the subjects covered by his major and minors. The final examination will be upon the candidate's thesis.

CIRCULAR NO. 36

OF

The New York State  
College of Forestry

AT

SYRACUSE UNIVERSITY

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*Announcement of Courses*

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1922-1923

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Published by the University

# CALENDAR

FOR ALL DEPARTMENTS OF THE UNIVERSITY  
(Vacation periods are inclusive of the dates given)

## 1923

March 29 - April 4,		<i>Thursday-Wednesday</i> —Easter vacation.
June	9,	<i>Saturday</i> —Annual meeting of the University Senate, 10 a.m.
	10,	<i>Sunday</i> —Baccalaureate Sermon, Gymnasium, 10:30 a.m.
	11,	<i>Monday</i> —Class day exercises, 9 a.m.
	12,	<i>Tuesday</i> —Annual meeting of the Trustees, 9 a.m. Annual meeting of the Alumni Association, 11 a.m.
	13,	<i>Wednesday</i> —Commencement, 10 a.m.
July 2 - Aug. 10,		<i>Monday-Friday</i> —Summer Session.
Aug. 13 - Sept. 14,		<i>Monday-Friday</i> —Summer Session, second term.
Sept.	1-15,	<i>Saturday-Saturday</i> —Summer Surveying Camp.
	17-19,	<i>Monday-Wednesday</i> —Entrance and Supplementary ex- aminations.
	17-19,	<i>Monday-Wednesday</i> —Registration in all colleges.
	19,	<i>Wednesday</i> —First semester begins in all colleges. Students assemble in John Crouse College Hall, 9:30 a.m.
Oct.	1,	<i>Monday</i> —Extension Courses begin.
Nov.	6,	<i>Tuesday</i> —Election Day. No classes.
Nov. 29 - Dec. 1,		<i>Thursday-Saturday</i> —Thanksgiving vacation.
Dec.	11,	<i>Tuesday</i> —Meeting of Trustees, 9:30 a.m.
Dec. 20 - Jan. 2,		<i>Thursday-Wednesday</i> —Christmas vacation.

## 1924

Jan.	21,	<i>Monday</i> —Beginning of registration for second sem- ester Extension Courses.
	26,	<i>Saturday</i> —First semester ends.
	28-30,	<i>Monday-Wednesday</i> —Senior week. Entrance ex- aminations. Registration for second semester.
	31,	<i>Thursday</i> —Second semester begins.
Feb.	4,	<i>Monday</i> —Second semester Extension Courses begin.
	7,	<i>Thursday</i> —Day of Prayer for Colleges.
	22,	<i>Friday</i> —Washington Birthday. No classes.
April	17-23	<i>Thursday-Wednesday</i> —Easter vacation.
June	7-11,	<i>Saturday-Wednesday</i> —Commencement week.



# TRUSTEES OF NEW YORK STATE COLLEGE OF FORESTRY

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## EX-OFFICIO

- DR. CHARLES WESLEY FLINT,.....*Syracuse, N. Y.*  
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# FACULTY OF THE NEW YORK STATE COLLEGE OF FORESTRY

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## AT SYRACUSE UNIVERSITY

CHARLES WESLEY FLINT, M.A., D.D., LL.D.

*Chancellor of the University*

WILLIAM PRATT GRAHAM, Ph.D.

*Vice-Chancellor of the University*

FRANKLIN MOON, A.B. 1901, (Amherst); M.F. 1909, (Yale).

*Dean of the College; Professor of Silviculture*

MAULSBY WILLETT BLACKMAN, A.B. 1901, A.M. 1902, (Kansas); Ph.D. 1905 (Harvard)

*Professor of Forest Entomology*

NELSON COURTLANDT BROWN, B.A. 1906, M.F. 1908, (Yale)

*Professor of Forest Utilization*

LEIGH H. PENNINGTON, A.B., 1907, Ph.D. 1909, (Michigan)

*Professor of Forest Botany*

JOHN WALLACE STEPHEN, B.A., M.F., 1907, (Michigan); M. Ped

*Professor of Silviculture*

CHARLES CHRISTOPHER ADAMS, B.S. 1896, (Illinois Wesleyan);

M.S. 1899, (Harvard); Ph.D. 1908, (Chicago); Sc.D. 1920, (Illinois Wesleyan)

*Professor of Forest Zoology; Director of the Roosevelt Wild Life Forest Experiment Station.*

HARRY P. BROWN, A.B., 1909; A.M., 1910; Ph.D., 1914, (Cornell)

*Professor of Wood Technology*

LAURIE D. COX, A.B., 1903, (Acadia College); S.B., in Landscape

Architecture, 1908, (Harvard)

*Professor of Landscape Engineering*

HENRY R. FRANCIS, B.S., 1910, (Massachusetts Agricultural College)

*Professor of Forest Recreation*

LOUIS E. WISE, A.B., 1907; Ph.D., 1911, (Columbia)

*Professor of Forest Chemistry*

REUBEN PARKER PRICHARD, B.S., 1907, (Dartmouth); M.F.

1909, (Yale)

*Professor of Silviculture*

CLARENCE EARL LIBBY, B.S., in Chemical Engineering, 1916,  
(Maine)

*Professor of Pulp and Paper Manufacture*

JAMES F. DUBUAR, A.B., 1914; M.F., 1915, (Michigan)

*Director and Professor of Forestry, New York State Ranger School*

EARLE S. PEIRCE, B.S., 1909, (Yale)

*Director of Forest Extension*

GURTH A. WHIPPLE,

*Professor of Forest Extension*

GUSTAV F. LENTZ, PH.B., 1915; M.F., 1917, (Yale)

*Professor of Forestry at State Ranger School*

RICHARD R. FENSKA, B.S., 1911, (Beloit); M.F., 1913, (Yale)

*Professor of Forest Engineering*

WILLIAM C. KENDALL, A.B., A.M., 1885 (Bowdoin); M.D., 1896,  
(Georgetown)

*Ichthyologist, Roosevelt Wild Life Forest Experiment Station*

HIRAM LEROY HENDERSON, B.S. 1915, (Michigan)

*Assistant Professor of Forest Utilization*

CARL CHESWELL FORSAITH, A.B. 1913, (Dartmouth); A.M.  
1914; PH.D. 1917, (Harvard)

*Assistant Professor of Wood Technology*

HAROLD CAHILL BELYEA, B.A. 1908; M.A. 1911, (Mount Allison  
University); B.Sc.F. 1911, University of New Brunswick; M.E. 1916,  
(Yale)

*Assistant Professor of Forest Engineering*

ALAN F. ARNOLD, (Landscape Architecture, Harvard, 1904-08)

*Assistant Professor of Landscape Extension*

WILFORD E. SANDERSON, B.S. 1917, (New York State College of  
Forestry)

*Assistant Professor of Forest Extension and Director of Summer  
Camp*

ALVIN GOODNOW WHITNEY, A.B. 1907, (Dartmouth)

*Assistant Director, Roosevelt Wild Life Forest Experiment Station*

WILLIAM S. KNICKERBOCKER, A.B. 1917; A.M. 1918, (Columbia)

*Assistant Professor of English and Registrar*

DON M. BENEDICT, B.S. 1917, (Michigan)

*Assistant Professor of Forest Botany*

EDWIN ADOLPHUS HARTLEY, B.S. 1918, (Oregon Agricultural  
College); M.S. 1921, (Ohio State)

*Assistant Professor of Forest Entomology*

- RAYMOND J. HOYLE, B.S. 1917, (New York State College of Forestry )  
*Instructor in Forest Utilization*
- I. LAURANCE LEE, B.S. 1915 ; M.F. 1919, (Yale)  
*Instructor in Forest Extension*
- CHARLES E. SIFFERLEN, B.S. 1916, (New York State College of Forestry) ; M.F. 1920, (Yale)  
*Instructor in Forest Engineering*
- HARRY E. WESTON, B.S. 1920, (New York State College of Forestry)  
*Instructor in Pulp and Paper Manufacture*
- RAY S. HIRT, B.S. 1917, (Hamline College)  
*Instructor in Forest Botany*
- WILFORD A. DENCE, B.S. 1919, (New York State College of Forestry)  
*Assistant, Roosevelt Wild Life Forest Experiment Station*
- BARNEY A. SARECKY, A.B. 1922, (Syracuse University)  
*Instructor in Forest Zoology*
- FREDERICK G. MUNDINGER, B.S. 1914, (Syracuse) ; M.S. 1922.  
New York State College of Forestry)  
*Instructor in Forest Entomology*
- JOHN ELTON LODIEWICK, B.S. 1919, M.S. 1920, (New York State College of Forestry)  
*Instructor in Wood Technology*
- JOHN WOOD CHARLTON, B.S. 1922, (College of Wooster)  
*Assistant in Forest Botany*
- GEORGE E. FRENCH, B.S. 1922 (New York State College of Forestry)  
*Assistant in Wood Technology*
- RUBY W. HOWE,  
*Secretary to the Dean*
- WALTER W. CHIPMAN, B.S. 1893 ; A.M. 1904, (Wabash)  
*Assistant Treasurer*
- JOHN W. WEBBER,  
*Bookkeeper*
- ELEANOR CHURCH, B.L.E. 1916, (Syracuse)  
*Librarian*
- CECILE CONVERS, B.L.E. 1922, (Syracuse)  
*Reference Librarian*

# THE NEW YORK STATE COLLEGE OF FORESTRY

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The act which created The New York State College of Forestry at Syracuse University in 1911 obligates the College to carry on two important and co-ordinate lines of work; first it is to undertake such special research and state-wide investigation in Forestry as will throw light upon and help in the solution of Forest problems which are now confronting the State and the people of New York; second it is the institution for educational work in Forestry in the State.

## INVESTIGATION AND DEMONSTRATION

In meeting the first obligation of the College of Forestry that is, the carrying on of research and state-wide investigation in Forestry, two small adjacent farms south of the city were purchased in the spring of 1912 and these have been consolidated and designated as The State Forest Experiment Station. Experimental work was begun at this station in the spring of 1912 and there are growing at present a large number of tree seedlings and transplants as experimental plantings.

The gift of 1800 acres of land in the Adirondacks to the University for Forestry purpose adds greatly to the facilities of the College for the carrying on of very definite lines of experimental and demonstrational work. In 1913 the College purchased 1016 acres of cut-over land in Cattaraugus County and 113 acres in Madison County. These two Forest Stations are located directly adjacent to important lines of railway and have very great value for demonstrational and experimental purposes. Manifestly such facilities as these various pieces of land offer will be of great value in the work of instruction.

## PLAN AND SCOPE OF INSTRUCTION

Instruction in the field of Forestry proper comprises the following:

1. Lectures and field instruction in historical and economical aspects of Forestry for all students of the University desiring a knowledge of the meaning of Forestry.
2. More extended instruction along these lines to those who desire to prepare themselves to give instruction in Forestry in the Public Schools.



3. Instruction and advice by means of lectures throughout the State before High Schools and Granges and other organizations interested in any way in the Conservation of our natural resources; the publication of Bulletins and the giving of expert advice on the ground for the benefit of owners of hill lands, of farm woodlots and of timber lands to enable owners to handle these lands so as to make them much more productive than at the present time.

4. Special service to both producers and consumers of forest products such as special market investigations and studies of closer utilization of waste material as may bring producer and consumer together. Co-operative marketing of farm woodlots and development of markets for such by-products of the forest as Christmas trees, burned timber and thinnings from sprout growth, already begun by the College.

5. Training of young men in such practical lines of Forestry work as will fit them to fill subordinate positions in the State and National Service. To do this work effectively, a State Ranger School is in operation on the College forest at Wanakena, N. Y. In this School men are trained to fill such positions as Guards, Rangers, Forest Estate Managers, Tree Planting Experts and Nursery Foreman. The year of practical work in the State Ranger School does not necessarily lead to the profession of Forestry.

6. The training of professional Foresters for positions of large responsibility in the State and National Service, or as Forest Experts for private Forest work of any kind.

7. The giving of special technical training to advanced students in Forestry, in Lumbering, Paper and Pulp-making, and other phases of Forest Utilization, in Forest Management, in Dendrological Chemistry, in Forest Entomology, Forest Pathology, Forest Zoölogy, etc.

8. Realizing that the continued advancement of Forestry must rest upon a firmer scientific basis, the College believes that one of its most important functions will consist in the proper training of men so that they will be competent to carry on independent investigations in the various phases of scientific Forestry and in the allied sciences. Leaders of forest research must necessarily have taken graduate work in Forestry in its various aspects.

## FACILITIES FOR INSTRUCTION

In 1913 the State of New York appropriated \$250,000 for a Forestry Building on the Campus of Syracuse University. This was completed during the college year of 1916-1917 and occupied by the College during

the second semester. This building is one of the best and most effectively equipped Forestry Buildings in the United States.

The College is unusually well equipped with apparatus for laboratory work in Forest Botany, Pathology, Dendrology, Wood Technology, Zoölogy, Entomology and Pulp and paper manufacturing, and with instruments for field work in Forest Mensuration and Surveying.

The College has a Forest Library in charge of a graduate librarian and it is being made as complete as possible in literature covering all phases of Forestry and the sciences having a bearing upon Forestry. This library, in connection with the State Forest Experiment Station located south of the city, and the excellent facilities for advanced work offered in the several scientific laboratories of the College should appeal strongly to research students.

## FOREST NURSERY PRACTICE

The State Forest Experiment Station just south of the city offers unusual advantages for instructional work in forest nursery practice and other phases of silviculture.

Besides the Experimental Nursery, the Station has a woodlot of thirty acres which is used for demonstration purposes in the marking of trees for thinning and for underplanting.

## FACILITIES FOR GENERAL FIELD WORK IN FORESTRY

Early in the spring of 1912, 1850 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks was given to the University for Forestry purposes by the Rich Lumber Company of Wanakena, N. Y. This land is very typical of cut-over areas in Northern New York and is splendidly adapted for general Forestry work both for the students of the State Ranger School and for the professional Forestry students. In September, 1912, the State Ranger School was opened on this tract with 16 students and two instructors. The tract is being studied carefully and during 1913 a permanent working plan was made which will be carried out over a long period of time. The School has been designated as a Branch State Weather Station. All of this offers splendid opportunity for the carrying on of research and experimental work. The Sophomore Summer Camp is held each year from June 1 to August 31 on Cranberry Lake.

Beside the gift of the forest land in the Adirondacks, three tracts of land were secured by purchase. The largest of these tracts is a

piece of 1016 acres, two hours south of Buffalo in Cattaraugus County and known as the Redhouse Station. The second piece is a tract of 113 acres at Chittenango in Madison County, which was formerly the Experimental Farm of the New York Central Railroad. The third and most important purchase was two small, adjacent farms of a hundred acres just south of Syracuse, lying between South Salina Street and Lafayette Road. This is known as the State Forest Experiment Station and upon it the principal forest nursery of the College is maintained. Every Forestry student is expected to carry through during his course some definite forest operation, working out the plan and carrying through each operation himself. This will give him the right practical training as well as confidence in carrying on practical work.

The location of The New York State College of Forestry at Syracuse is especially favorable to the carrying out of both professional training of students and state-wide educational work. All sections of the Adirondacks are easily accessible by rail. Numerous steam and electric lines radiating in every direction from the city lay the entire region of central and northern New York open to the work of the students. There is no better strategic center with respect to solving the Forestry problems which confront the people of the State.

# GENERAL INFORMATION

## EXPENSES

All bills except for dormitory rooms and board are payable at the Treasurer's office, Forestry Building. Checks should be drawn payable to W. W. Chipman, Treasurer.

### MATRICULATION

Every student on entering the University is required to pay a matriculation fee of \$5.00, which is not returnable. This fee is not required of students passing from one college to another within the University nor of students transferring from another institution if evidence is submitted that such a fee was paid in the former institution. All students entering upon graduate work pay a matriculation fee of \$5.00.

### FEES

All fees for instruction and incidentals are payable twice a year, on or before the first day of each semester. The Treasurer's receipt admits to classes.

Tuition per year (Non-residents).....	\$75.00
Matriculation (Paid once).....	5.00
Sophomore Summer Camp (Paid once) not including board..	25.00
*Library Deposit (returnable).....	5.00

Summer Camp Fee \$15 first week; \$10 per week after the first week, in addition to board.

### PER SEMESTER

Incidentals, Campus fee.....	\$15.00
Student Activities .....	1.75
Infirmary .....	4.00
Laboratory Fees (all undergraduates) .....	20.00
Laboratory Fees (graduates) .....	25.00
Diploma Fee .....	10.00

Paper and Pulp students \$10 per semester in addition to regular fees beginning first semester Sophomore year.

\*The Library Deposit will be returned at time of graduation, or on leaving College, if personal notice is given *before* leaving.

*DORMITORIES*

For circular of information and diagrams of dormitories address the Treasurer of the University.

An advance deposit of \$10.00 must be paid by each student at the office of the Treasurer of the University in the Administration Building when room is engaged or reserved. This payment will be credited upon the first term's bill and will be refunded in case the student does not become or remain a student in the University, provided the room is given up before September 1st.

All remaining payments for rooms and board are payable quarterly in advance, as follows: (1) At the beginning of the college year, (2) the first day after Thanksgiving recess, (3) at the beginning of the second semester, (4) the first day after the Easter vacation.

*SELF-HELP*

Students who desire temporary or permanent work should confer with the Director of the Appointments Office.

*PHYSICAL TRAINING*

Robust health is necessary to attain high scholarship in college and to perform successfully the duties of later life. With this end in view considerable stress is laid upon well-regulated physical training. Every undergraduate student in the College of Forestry is required to take systematic exercise, including swimming in the gymnasium, during the first year of the course unless physically unable to engage in it.

A medical examination is given every student when he enters upon gymnasium work and his exercises are adapted to the requirements of his health and to the development of a sound body.

*ATHLETICS*

The Athletic interests of the University are in the hands of the Athletic Association: All business is transacted through the Athletic Governing Board, which contains representatives from the faculty, the alumni, the students, and interested business men of the city. Through this Association the students support teams in all branches of athletics. The Stadium will accommodate all branches of outdoor athletics with the best possible facilities.

*PHOTOGRAPHIC RECORD*

For the purpose of a record of all men who enter the College of Forestry and for historical purposes, the College of Forestry requires



a cabinet size photograph of every man who enters the College either in the courses at Syracuse or in the State Ranger School at Wanakena. The photograph will be required to complete registration.

### REQUIREMENTS FOR ADMISSION

Students entering the regular Course leading to a degree must offer 15 units of preparatory work of High School grade. A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. Two to three hours of laboratory, drawing or shop work count as equivalent to one hour of recitation. No candidate is eligible for admission to the professional courses if deficient in more than 1 count of entrance conditions. The following subjects are required for admission to The State College of Forestry:

English (four years)	.	.	.	.	.	.	.	.	3 Units
History (American, English, Ancient or Medieval)	.	.	.	.	.	.	.	.	1 "
Algebra, Elementary	.	.	.	.	.	.	.	.	1 "
Geometry, Plane	.	.	.	.	.	.	.	.	1 "
Geometry, Solid	.	.	.	.	.	.	.	.	1/2 "
French, German, or Spanish	.	.	.	.	.	.	.	.	2 "
Physics	.	.	.	.	.	.	.	.	1 "
Other sciences (Chemistry, Geology, Zoölogy,									
Agriculture, etc.)	.	.	.	.	.	.	.	.	2 "
Elective (History, Language, Mathematics, Sciences, etc.)	.	.	.	.	.	.	.	.	3 1/2 "

The College in maintaining a high standard of work believes that satisfactory College work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of Forestry and that there is no short cut to the profession. The College urges every young man who is considering the study of Forestry to make up his mind to spend all the time necessary for thorough preparation for College work. If young men before entering College could spend a summer or two or a whole year working in a lumber camp or saw mill or in some manufacturing establishment where wood is used, they would be much better prepared for professional work in Forestry.

Freshmen are accepted only at the beginning of the Fall semester. There is no opportunity to enter at midyear except on advanced standing from some other college.

## UNDERGRADUATE WORK IN THE COLLEGE OF FORESTRY

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### I. THE FOUR YEAR COURSE IN GENERAL FORESTRY LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

This is essentially a general college course in which the student studies Forestry as his major subject. He should realize that this course must necessarily fall short of the measure of special training necessary for the professional Forestry degree. This course is designed for students who desire a somewhat intimate knowledge of various branches of Forestry for the general satisfaction which such knowledge gives, or for the use they can make of it in a practical way; for those who wish to prepare themselves to teach certain aspects of Forestry in the public schools; or for those who after their college course wish to take subordinate positions in lumbering or manufacturing of forest products or subordinate positions in State or National Forest Service. Such students will not be entitled to the designation of Professional Foresters merely upon the completion of the four years' course.

### II. THE FOUR YEAR COURSE IN PULP AND PAPER MANUFACTURE LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

This course has been established to fill the increasing demand for technical men in the important field of utilization included by the pulp and paper industry. The curriculum of the first year is identical with the general forestry course giving the student the opportunity of determining his future work at the College. The last three years of the course are largely devoted to chemistry, physics, engineering and the technical phases of pulp and paper manufacture. Upon satisfactory completion of the four year program the student should be qualified to enter the pulp and paper industry as a mill control chemist, a technologist in forest products or an operating mill executive.

### III. THE FIVE YEAR PROFESSIONAL COURSE LEADING TO THE DEGREE OF MASTERY OF FORESTRY

This course is designed to prepare professional Foresters for higher positions of responsibility in the State Service, the National Forest Service and for the position of expert Forester for private concerns.

The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man must of necessity build his professional training upon a foundation of general culture. It is the unanimous opinion of the leaders in Forestry education and in the development of Forestry policy in this country, that men who expect to follow the profession of Forestry act unwisely if they try to make a short cut by eliminating the foundation training. The large opportunities awaiting thoroughly trained Foresters fully justify them in devoting the full measure of time advised for preparation. It is expected that every man who takes the four year undergraduate course in the College will go on and complete his fifth year either immediately following the fourth year or after a year or two of practical work.

The fifth year of this five year course is in reality graduate work and subject to the rules governing graduate work in the College of Forestry.

## **GRADUATE WORK**

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Graduate work in the College has been planned with the purpose of training two different types of men—first, the man with a more complete, broad, general training in forestry and, second, the specialist, capable of investigating special economic and scientific problems of forestry. The broad, general training is designed to train men as administrators of state, national or private forests or parks. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting at least five years of study in preparation. For this reason it is strongly urged that students who have shown proper ability in the four year course in the College return and complete a fifth year either immediately following the fourth year or after a year or two of practical work. This five year course leads to the degree of Master of Forestry.

There are a vast number of technical and scientific problems which must be investigated before forestry really comes into its own in this country and such problems can be solved only by the man who has been specially trained in methods of investigation and who is thoroughly conversant with the research in his own field. The College of Forestry is offering graduate work in all phases of scientific forestry such as silviculture, wood technology, forest pathology, forest entomology, forest zoölogy, forest chemistry, etc.

The graduate work is open not only to graduates of forestry courses but under certain restrictions, mentioned in another place, to men whose

undergraduate work has been along other scientific lines. Two degrees are open to men taking such work: Master of Science and Doctor of Philosophy, the requirements of which are given at another place.

## RULES GOVERNING GRADUATE WORK IN THE COLLEGE OF FORESTRY

### *DEGREES OFFERED*

The following degrees will be conferred upon the satisfactory completion of approved schedules of courses and of the other requirements:

Master of Forestry, Master of City Forestry, Master of Science, and Doctor of Philosophy.

It should be understood that the time requirements mentioned below are minimum requirements only. The College does not obligate itself to grant degrees, except upon the completion of all the work in a manner satisfactory to its faculty. The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.

### *MAJORS AND MINORS*

At the time of enrolling, the candidate for a degree shall submit a schedule consisting of not more than 15 semester hours in each semester. This schedule shall be distributed between a major of nine semester hours and two minors of three semester hours each. If so desired, both the major and one minor may be taken in one department or both minors may be taken in one department. This schedule must receive the approval of the graduate committee and the Dean.

### *REQUIREMENTS FOR THE DEGREE OF MASTER OF FORESTRY*

For the successful prosecution of the work the ability to read German at sight is necessary.

For candidates who are graduates of approved courses in technical forestry a minimum of one year of residence work is required. For graduates in other courses a minimum of two years residence work will be necessary.

A thesis or report showing the candidate's ability to complete satisfactorily an investigation upon a topic connected with the candidate's major study must be submitted to the professor in charge not later than May 1st of the year in which the candidate receives his degree. This,

if approved by the professor in charge, and if acceptable to the graduate committee is so endorsed and a copy is deposited in the library.

Upon the acceptance of his thesis the candidate will be notified and provided he has satisfactorily passed written examinations in all his courses he will at the same time be instructed when to appear for an oral examination. This examination will be given by the professors under whom the candidate's work has been taken—the Dean or some member of the graduate committee acting as chairman. Any member of the faculty is privileged to be present and to participate. This examination will not take place later than June 1st.

#### *REQUIREMENTS FOR THE DEGREE OF MASTER OF CITY FORESTRY*

A reading knowledge of French is desirable.

For students who are graduates of the course in City Forestry in this College or who have had equivalent courses, a minimum of one complete year of residence work of acceptable grade along approved lines is required.

Similar requirements with regard to thesis and oral examination as for the Master of Forestry degree are in force.

#### *REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE*

For the successful completion of the work, the ability to read German at sight is necessary.

For students who are graduates in forestry of this institution or others of a similar grade, a minimum of one year of residence work of an acceptable grade is desired.

Students who are graduates in lines other than forestry may be recommended for their degree on the completion of one year of satisfactory residence work provided he has taken at least one minor in forestry. *The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.*

Similar requirements are made as regards thesis and oral examinations as for the preceding two degrees.



*REQUIREMENTS FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY*

A candidate must be a graduate of a college of approved standing and his undergraduate standing must have been such as to fit him to pursue advanced work in the subject which he chooses as his major. Before beginning the second year of graduate work the candidate must demonstrate his ability to read scientific German and French at sight.

In case the candidate holds merely the Bachelor's degree a minimum of three years' graduate work is required. One year's residence in graduate work at another college may be substituted with the approval of the Dean and graduate committee.

At the time of enrolling the candidate must choose the major study and two minor studies subject to the same rules as those governing other graduate work. If the candidate is not a graduate in forestry at least one of these minors during two years of his course must be in forestry.

A thesis demonstrating the results of scientific research upon a topic bearing upon his major subject must be completed and receive the approval of the major professor not later than May 1st of the year in which the degree is granted. This must be satisfactory to the Dean and graduate committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the college library.

The candidate is required to pass two examinations, both oral. The preliminary examination will be upon the subjects covered by his major and minors. The final examination will be upon the candidate's thesis.

## V. TRAINING IN THE STATE RANGER SCHOOL

The State Ranger School gives a practical course of one year which trains men very thoroughly for such positions as forest guard, forest ranger, forest estate manager, tree planting expert and nursery foreman. The work is largely of a practical nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of various methods of logging and lumbering and nursery practice and tree planting. It is to be understood that this practical training is not an education in Forestry and that upon completion of the course a man will not be a trained Forester. A certificate is given after completion of a year of satisfactory work in the school and a diploma following a year of satisfactory practice. A special bulletin of the Ranger School will be sent upon request. Address: Director James F. Dubbar, New York State Ranger School, Wanakena, N. Y.

## PROGRAM OF COURSES IN GENERAL FORESTRY

## FRESHMAN YEAR

FIRST SEMESTER		SECOND SEMESTER	
Elementary Forestry	2 hrs.	English 1	3 hrs.
English 1	3 "	Forest Zoölogy 1	3 "
Mathematics 1	3 "	Chemistry 1	3 "
Botany 1	3 "	Botany 2	4 "
Chemistry 1	3 "	Modern Language	3 "
Modern Language	3 "		
	17 hrs.		16 hrs.

## SOPHOMORE YEAR

FIRST SEMESTER		SECOND SEMESTER	
Wood Technology 1	5 hrs.	Engineering 2	5 hrs.
Engineering 1 or Physics	3 "	Engineering 1 or Physics	3 "
Silviculture 2	3 "	Geology 2	3 "
Geology 1	3 "	Entomology 1	3 "
English 2	3 "	Wood Technology 1	3 "
	17 hrs.		17 hrs.

SOPHOMORE SUMMER CAMP, ON CRANBERRY LAKE IN THE ADIRONDACKS, JUNE 1 TO AUGUST 31. Required of all students in Forestry. Prerequisites: Silviculture II., Wood Technology I., Engineering I. and II., Botany I. and II., Entomology I. Instruction by members of the various departments. No Junior who has not had the prescribed engineering at the summer camp will be permitted to take Engineering III.

## JUNIOR YEAR

FIRST SEMESTER		SECOND SEMESTER	
Engineering 3	3 hrs.	Silviculture 4	3 hrs.
Wood Technology 3	3 "	Botany 3	3 "
Botany 6	3 "	Economics 1	3 "
Utilization 1	3 "	Forest History	3 "
Electives	6 "	Electives	6 "
	18 hrs.		18 hrs.

ELECTIVES—FIRST SEMESTER	ELECTIVES—SECOND SEMESTER
German 5	Forest Chemistry 2
Utilization 2	Forest Geology 4
Qualitative Analysis	Utilization 4, 8
Forest Entomology 2, 3, 6	Qualitative Analysis
Forest Zoölogy 2, 3, 4, 6	Wood Technology 4, 5
Wood Technology 2	Forest Entomology 7, 8, 9
Arboriculture 1	Forest Zoölogy 3, 4, 5
Landscape Engineering 2	Arboriculture 1, 2
French 2	Landscape Engineering 2, 8
Spanish 2	Silviculture 1
Engineering 5	
Silviculture 3	
Forest Chemistry 2	

## SENIOR YEAR

FIRST SEMESTER	SECOND SEMESTER
Engineering 4	Utilization 5
Business Law	Rhetoric
Silviculture 5	Silviculture 7
Electives	Forestry Seminar
	Forest Laws and Policies
	Electives
17 hrs.	18 hrs.

ELECTIVES	ELECTIVES
Pulp and Paper Manufacturing, 1	Forest Utilization 3, 9, 10, 11
Industrial Chemistry	Pulp and Paper Manufacturing, 1
Forest Recreation 2	Industrial Chemistry
Forest Botany 7, 8	Wood Technology 5
Botany 19	Forest Recreation 4
Forest Entomology 2, 8, 9, 10	Forest Botany 8, 10
Forest Zoölogy 3, 4, 5, 6, 7	Range Grazing
Landscape Engineering 3, 4, 5	Botany 19
Engineering 5	Forest Zoölogy 3, 4, 5, 6
Utilization 6, 7, 9	Forest Entomology 9, 10
National Forest Practice	Arboriculture 3, 4
Wood Technology VI	Landscape Engineering 3, 5
Forest Chemistry 3	Engineering 6, 7
Qualitative Analysis	Forestry Seminar
	Silviculture 6
	Qualitative Analysis

# SCHEDULE FOR PULP AND PAPER COURSE 1922-1923

SUBJECT TO FUTURE CHANGE

## FRESHMAN YEAR

FIRST SEMESTER		SECOND SEMESTER	
General Forestry	2 hrs.	Forest Zoölogy I	4 hrs.
English I	3 "	English I	3 "
Forest Botany I	3 "	Forest Botany II	4 "
German I	3 "	German I	3 "
Chemistry I	3 "	Chemistry I	3 "
Math. I, Trigonometry	3 "		
	17 hrs.		17 hrs.

## SOPHOMORE YEAR

Wood Technology	5 hrs.	Wood Technology I	3 hrs.
Physics I	4 "	Physics I	4 "
Chem. III, Qualitative	3 "	Chem. III, Qualitative	3 "
Mechanical Drawing IV	2 "	Mechanical Drawing V	2 "
Math. II, Algebra	3 "	Math. III, Analytics	3 "
		English II	3 "
	17 hrs.		18 hrs.

## THREE MONTH'S SUMMER WORK IN A PULP OR PAPER MILL

## JUNIOR YEAR

Rhetoric IV, Public Speaking	3 hrs.	Economics I	3 hrs.
Forest Chem. II, Organic	3 "	Forest Chem. II, Organic	3 "
Chem. IV, Quantitative	3 "	Chem. IV, Quantitative	3 "
Pulp & Paper Mfg. I, Tech.	3 "	Pulp & Paper Mfg. I, Tech.	3 "
Pulp & Paper Mfg. II, Lab.	2 "	Pulp & Paper Mfg. II, Lab.	2 "
Pulp & Paper Mfg. III, Mach.	3 "	Pulp & Paper Mfg. III, Mach.	3 "
Pulp & Paper Mfg. IV, Mill Analyses	2 "	Pulp & Paper Mfg. V, Paper Testing	2 "
	19 hrs.		19 hrs.

## THREE MONTHS SUMMER WORK IN A PULP OR PAPER MILL

### SENIOR YEAR

Economics VIII	3 hrs.	Textile Fibers	2 hrs.
Wood Technology III	3' "	Wood Technology III	3 "
Electrical Engineering	3 "	Mechanical Engineering	3 "
Pulp & Paper Mfg. VI, Bleaching	1 "	Pulp & Paper Mfg. VII, Coloring	1 "
Pulp & Paper Mfg. IX, Problem	1 "	Pulp & Paper Mfg. X, Problem	3 "
Forest Chemistry III, Cellulose	2 "	Pulp & Paper Mfg. VIII, Organization	1 "
*Math. II, Algebra	3 "	*Math. III, Analytics	3 "
Business Law I	2 "	Business Law I	2 "
	18 hrs.		18 hrs.

\*These courses, which formerly were not included in the pulp and paper curriculum, will be replaced next year by other courses as the courses in mathematics are now offered during the Sophomore year.

## DESCRIPTION OF COURSES IN THE COLLEGE OF FORESTRY

NOTE—A numerical following the title of the course indicates the number of credit hours a week. All courses extend through the year unless followed by a Roman numeral, which limits the subject to the semester named.

*Courses open to all students of the University.*

**FORESTRY. 1a. GENERAL FORESTRY.** Three hours. Place of forestry in the life of State and Nation. This is a synoptical course designed to give a general survey of the subject of forestry and other phases of conservation. Not open to students in the State College of Forestry but to all others.—I. Mr. Stephen.

**SILVICULTURE. 1a. FARM FORESTRY.** Three hours. Development and management of the farm woodlot. Utilization of idle lands for the production of wood for local uses. Open to all students of the University except those in the College of Forestry.—II. Mr. Stephen.

**LANDSCAPE ENGINEERING. 1.** Two hours. Appreciation of Landscape Architecture. The principles of art which underlie landscape design. The more important historical styles of gardening. Open to men and women in the University.—II. Mr. Cox.



## DEPARTMENT OF SILVICULTURE

PROFESSORS STEPHEN AND PRITCHARD

*Courses 2, 4, and 7 required of all undergraduates.**Courses 1, 3, and 6 elective for graduates or undergraduates.*

1. FARM FORESTRY. 3. Elective. Three hours lecture. Development and management of the farm woodlot.—II. Mr. Stephen.

2. ELEMENTARY SILVICULTURE. 3. Required Sophomore three hours lecture. Four hours laboratory. Effect of environment on tree development, the forest as a society, the effect of the forest on plants, of moist conditions within and without the forest and the effects of forests on temperature, soil, ground cover.—I. Mr. Pritchard.

3. SEEDING AND PLANTING. 3. Elective. Two hours lecture. Four hours laboratory. A course dealing with all phases of forest propagation especially by seeding and planting.—I. Mr. Stephen.

4. SILVICULTURAL SYSTEMS. 4. Required Junior. Three hours lecture. Eight hours field. Methods of reproduction of forests as bearing upon silvicultural systems used in this country and abroad.—II. Mr. Stephen.

5. ADVANCED SILVICULTURE PRACTICE. Required Senior. Two hours lecture. Special problems in the practice of silviculture in this country and abroad.—I. Mr. Stephen.

6. FOREST PROTECTION. 4. Elective. Two hours lecture. Protection of forests from fire, wind, frost, animal and other destructive agencies.—II. Mr. Pritchard.

Silviculture 7 required of Senior II.

## DEPARTMENT OF WOOD TECHNOLOGY

PROFESSOR H. P. BROWN, ASSISTANT PROFESSOR C. C. FORSAITH,

INSTRUCTOR J. E. LODEWICK, ASSISTANT G. E. FRENCH

*Courses 1 and 3 are required of all undergraduates.**Courses 2, 4, 5, and 6 are elective for graduates and undergraduates.**Course 7 is for graduates only.*

1. ELEMENTARY DENDROLOGY. 5. Required Sophomore. Five hours the first semester, 3 hours lecture, 1 hour recitation, and 3 hours laboratory; 3 hours the second semester, 2 hours lecture, 3 hours laboratory. Studies in the Identification and Taxonomy of Woody Plants with especial reference to the species native to New York State, and other important Forest Regions of the United States and abroad. Studies of the silvicultural characteristics and the Forest Regions are included.—I. and II. Mr. Lodewick.

2. ORNAMENTAL WOODY PLANTS. 3. Elective. One hour conference and 6 hours Laboratory. The Identification and Taxonomy of ornamental woody plants. (Prerequisite—Wood Technology I.) I. Mr. Forsaith.

3. WOOD TECHNOLOGY. 3. Required Junior. Two hours lecture and 3 hours laboratory. A study of the structural, physical, and chemical properties of wood. Identification of woods by gross and microscopic structure. (Prerequisite—Wood Technology I.) I and II. Mr. Forsaith.

4. ADVANCED HISTORICAL MORPHOLOGY. 3. Elective. One hour lecture and 5 hours laboratory. An evolutionary and practical study of prehistoric and modern woody plants. (Prerequisites—Wood Technology I and III.)—II. Mr. Forsaith.

5. TEXTILE FIBRES. 3. Elective. One hour lecture and 6 hours laboratory. A taxonomic survey of the textile fibres of commerce, including botanical source, supply, treatment, and identification. (Prerequisites—Wood Technology I and III.)—II. Mr. Lodewick.

6. THE MICROTECHNIQUE OF WOOD TISSUE. 3. Elective. One hour lecture and 6 hours laboratory. Preparation of wood for sectioning, the technique of staining, the use of the microtome, and the practice of photography in relation to wood technology. (Prerequisites—Wood Technology I and III.)—Mr. Lodewick.

7. RESEARCH IN DENDROLOGY AND WOOD TECHNOLOGY. Elective for graduates. Hours to be arranged. Mr. Forsaith.

12. *Advanced Historical Morphology*

## DEPARTMENT OF FOREST ENGINEERING

PROFESSOR FENSKA, ASSISTANT PROFESSOR BELYEA,

INSTRUCTOR SIFFERLEN

*Courses 1, 2, 3, and 4 required of all undergraduates.*

*Summer Camp Engineering is also required.*

*Courses, 5, 6, and 7 elective to graduates and undergraduates.*

1. PLANE SURVEYING. 3. Required Sophomore. One hour lecture. Six hours field work. A preliminary course in the use of surveying instruments and field methods. Lettering, mapping and office computations.—I or II. Mr. Fenska and Mr. Sifferlen.

2. FOREST MENSURATION. 5. Required Sophomore. Three hours lecture. Eight hours field work. A study of the measurements of volume of logs, tree and forests; estimating and mapping of timber, compilation of volume tables and collection of data in a detailed study of a forest area by steam analysis for purpose of predicting future possibilities.—II. Mr. Sifferlen.

The above courses are prerequisite for the Sophomore Summer Camp.

3. TOPOGRAPHIC SURVEYING. 3. Required Junior. One hour lecture. Six hours field work. Methods of topographic mapping, by aneroid and pacing, transit and stadia, abney level and slope chain, plane table with telescopic alidade, and trigonometric leveling.—I. Messrs. Fenska and Sifferlen.

Prerequisite—Summer Camp Engineering.

4. FOREST REGULATION. 3. Required Senior. Three hours lecture. Organization of forests for management. The normal and empirical forest, rotation and methods of regulating the cut.—I. Mr. Belyea.

5. FOREST INCREMENT. 3. Elective. Two hours lecture, one laboratory period. A continuation of Forest Mensuration as applied to the principles of determining increment and yields.—Mr. Belyea.

6. FOREST MANAGEMENT. 3. Elective. Three hours lecture. The scope of forest management in relation to other subjects in forestry. The fundamentals affecting the policies of forest management under national, state, corporate and private ownership.—II. Mr. Belyea.

7. FOREST ENGINEERING. 3. Elective. Three hours lecture. The application of engineering principles in the construction of trails, roads, bridges, logging railroads, chutes, flumes, dams, telephone line, fire towers, cabins, etc. for the development and proper utilization of a forest.—I. Mr. Fenska.

## DEPARTMENT OF FOREST UTILIZATION

PROFESSOR N. C. BROWN, ASSISTANT PROFESSOR HENDERSON,  
INSTRUCTOR HOYLE

*Courses 1 and 5 are required of all undergraduates.*

*Courses 2, 3, 4, 6, 7, 8, 9, 10, and 11 are elective to graduates and undergraduates who have prerequisites.*

1. LUMBERING. 3. Three hours lecture. Required of Juniors. History and development of the lumber industry and its relation to forestry. Detailed studies of logging, transportation and milling. Utilization 5 supplements this course and is required of all students taking Utilization 1. Mr. Brown.

2. PORTABLE MILLING AND WOODLOT LOGGING. 1. Elective, Juniors. The principles and practice of portable mill work and intensive logging and utilization.—I. Mr. Henderson.

3. BUSINESS METHODS IN THE LUMBER INDUSTRY. 3. Elective Seniors. Three hours lecture. A review of particular problems affecting the marketing of lumber.—II. Mr. Brown.

4. FOREST PRODUCTS. 3. Elective, Juniors or Seniors. Three hours lecture. A study of the so-called minor forest products such as veneer, paper pulp, cooperage, maple sugar, wood distillation, etc.—II. Mr. Brown.

5. FIELD LUMBER STUDY. Following the prerequisite course in Utilization I, a trip of two weeks to a month's duration is taken either individually or in a party to study the methods of logging and lumber manufacture.—II. Messrs. Brown, Henderson and Hoyle.

6. REGIONAL STUDIES IN LOGGING AND MILLING. 3. Elective, Seniors. Three hours. A detailed study will be made to supplement elementary course in Lumbering (Utilization).—I. Messrs. Brown, Henderson and Hoyle.

7. DRY KILN ENGINEERING. 3. Elective, Seniors or Graduates. One hour lecture and four hours laboratory. Consisting of a study of the theoretical and practical application of kiln drying of wood products. Landscape VIII, prerequisite.—I. Mr. Henderson.

8. WOOD PRESERVATION. 3. Two hours lecture and field trips. Elective, Juniors. Wood preservatives and methods of treatment. Prerequisites: Wood Technology I and III.—II. Mr. Henderson.

9. SPECIAL PROBLEMS IN UTILIZATION. Elective for Seniors and graduates. Conferences and special library and laboratory research in the lumber and associated industries. Credit hours to be arranged. Mr. Brown, Mr. Henderson and Mr. Hoyle.

10. AMERICAN LUMBER EXPORT TRADE. Two hours. Elective, Seniors or graduates. Second Semester. A study of export methods, ocean shipping, foreign finance and the present and future markets for American Lumber. Mr. Brown.

11. LUMBER SALESMANSHIP. Two hours. Elective, Seniors or graduates. Second semester. The principles underlying salesmanship with particular reference to lumber, and their application in the American lumber industry. Mr. Hoyle.

## DEPARTMENT OF FOREST BOTANY

PROFESSOR PENNINGTON, ASSISTANT PROFESSOR BENEDICT,

INSTRUCTOR HIRT, ASSISTANT CHARLTON

*Courses 1, 2, 3, 6 required of undergraduates.*

*Courses 7, 8, 9, 10 elective for graduates or undergraduates.*

*Course 11 for graduates only.*

Students who wish to take special work in Forest Pathology should elect Course 7, the first semester of the junior year.

1. FOREST BOTANY. 4. Required Freshman. Two hours lecture. Four hours laboratory. An elementary course throughout the first year dealing with structure and functions of plants and the fundamental problems of Botany, together with a general survey of the plant kingdom.—I. Messrs. Pennington, Benedict, Hirt and Gast.

2. FOREST BOTANY. 4. Required Freshman. A continuation of Forest Botany. I.—II. Messrs. Pennington, Benedict, Hirt and Gast.

3. PLANT PHYSIOLOGY. 3. Required Junior. Lectures and recitations. A course designed to teach the fundamental physiological processes involved in growth of plants.—II. Mr. Benedict. Prerequisites: Courses 1 and 2.

6. FOREST PATHOLOGY. 3. Required Junior. One hour lecture. Four hours laboratory. A course of lectures and laboratory work upon the diseases of plants in general with especial emphasis upon diseases of trees.—I. Messrs. Pennington and Benedict. Prerequisites: Courses 1, 2, and 3.

7. GENERAL MYCOLOGY. 3. Elective. One hour lecture. Four to six hours laboratory. A course in the structure and life histories of fungi.—I. Mr. Benedict. Prerequisites: Courses 1, 2, and 3.

8. ADVANCED FOREST PATHOLOGY. 3. Elective. One hour lecture. Four hours laboratory.—I and II. Mr. Pennington. Prerequisites: Courses 6 and 7.

9. CULTURE METHODS. 3. Elective. Six hours laboratory and conference. A study of technique in the isolation and pure culture of fungi.—II. Mr. Benedict. Prerequisites: Courses 6 and 8.

10. ADVANCED MYCOLOGY. 3. Elective. A year course in the classification of fungi.—I and II. Mr. Pennington.

11. RESEARCH IN FOREST BOTANY AND PATHOLOGY. Elective for graduates.—I and II. Messrs. Bray and Pennington.

## DEPARTMENT OF FOREST ENTOMOLOGY

PROFESSOR BLACKMAN, ASSISTANT PROFESSOR HARTLEY,

INSTRUCTOR MUNDINGER

*Course 1 is required of all undergraduates in Forestry.*

*Courses 2 and 3 are optional for Juniors and Seniors.*

*Courses 6, 7, 8, 9, and 10 may be taken either as special undergraduate work or as minors in the graduate courses.*

*Course 11 can be taken only as major graduate work.*

1. ELEMENTARY ENTOMOLOGY. 3. Required Sophomore. Two hours



recitation. Three hours laboratory. A general course devoted to the study of the morphology, life histories, and general classification of insects.—II. Messrs. Blackman, Hartley, Mundinger, and Assistants. Forest Zoölogy 1 is prerequisite for this course.

2. FOREST ENTOMOLOGY. 3. Elective. Two hours lecture. Three hours laboratory. Devoted to a study of those insects sustaining intimate relations to economic problems of Forestry.—I. Mr. Blackman, Mr. Mundinger, and Assistants. Course 1 is prerequisite.

3. INSECTS AFFECTING SHADE TREES AND ORNAMENTAL SHRUBS. 3. Elective. Two hours lecture. Two hours laboratory. Intended primarily for students specializing in City Forestry.—I. Mr. Hartley. Course 1 is prerequisite.

6. ADVANCED FOREST ENTOMOLOGY. 3. Elective. One hour conference. Four hours laboratory or field. Consisting of laboratory work, field work and library investigation.—I. or II. Mr. Blackman. Courses 1 and 2 are prerequisite.

7. INSECT ANATOMY. Elective. A more detailed study of the anatomy of certain insects not studied in previous courses. Messrs. Blackman and Hartley.

8. INSECT TAXONOMY. Elective. A more detailed study of the classification of some particular group of insects. Mr. Blackman.

9. INSECT HISTOLOGY. Elective. Mr. Blackman.

10. PROBLEMS IN FOREST ENTOMOLOGY. Elective. Individual study of small problems in forest entomology.—I or II. Messrs. Blackman and Hartley.

11. RESEARCH PROBLEMS IN FOREST ENTOMOLOGY. Elective. For graduate students.—I and II. Mr. Blackman.

## DEPARTMENT OF FOREST ZOOLOGY

PROFESSOR ADAMS, PROFESSOR——. INSTRUCTOR SARECKY

*Zoölogy 1 is required of all Freshmen.*

*Zoölogy 2, 3, 4, 5, 6, are open to Juniors and Seniors.*

*Zoölogy 8 is open only to Graduates.*

These courses are designed as a training in the scientific principles underlying the relation of animals to forest lands and waters, and national parks, and the application of these principles to the economic and social problems concerned with birds, fish game, fur-bearing and other forest animals.

1. GENERAL ZOÖLOGY. 3. Required Freshman. Two hours recitation.

Four hours laboratory. A course in general principles of Zoölogy.—II.

2. FISH AND GAME. 3. Elective. One hour lecture. Four hour laboratory or field. A course devoted primarily to a study of the more common fish, game, and forest animals.—I. Mr. Adams. Prerequisite: Zoölogy 1 or equivalent and Entomology 1.

3. ECOLOGY OF FRESH WATER ANIMALS. 3. Elective. One hour lecture. Four hours laboratory or field. This course is intended to give a scientific foundation for the application of animal ecology to the aquatic life of the lakes and streams of forest lands and parks. Mr. Adams. Prerequisite: Zoölogy 1.

4. ECOLOGY OF FOREST ANIMALS. Elective. One hour lecture. Four hours laboratory or field. This course is complementary to the preceding and is devoted to a training in the scientific foundations and the application of ecology to the land animals of coniferous and hardwood forests and national parks. Mr. Adams. Prerequisite: Zoölogy 2.

5. NATURAL HISTORY OF NATIONAL PARKS AND PRESERVES. 3. Elective. One lecture and four hours in laboratory or field. A study of the theory and practice of the principles underlying the appreciation and care of the natural history resources, mainly animals, of National Parks, State and private wild life preserves. Open to Juniors and Seniors.—II. Mr. Adams.

6. PROBLEMS IN FORESTRY ZOÖLOGY. Elective, hours to be arranged. Individual study of special Zoölogical problems. Mr. Adams. Prerequisites: Zoölogy 1 and 2.

7. ECOLOGICAL RESEARCH IN FOREST ZOÖLOGY. Elective to students.—I and II. Mr. Adams.

## DEPARTMENT OF LANDSCAPE ENGINEERING

PROFESSOR COX, ASSISTANT PROFESSOR ARNOLD

### ARBORICULTURE

1. PLANT MATERIALS. 3. Elective. Three hours lecture. With occasional field trips and preparation of planting plans. This course covers deciduous and evergreen shrubs, vines and perennials.—I. and II. Mr. Arnold.

2. PRUNING AND CARE OF TREES. 3. Elective. Two hours lecture. Two hours laboratory.—II. Mr. Cox.

3. SHADE AND ORNAMENTAL TREES. 2. Elective. Two hours lecture. Deciduous and evergreen trees used for shade or ornamental purposes—

their identification and use.—II. Mr. Arnold. Prerequisite: Arboriculture I.

4. STREET TREE PLANTING. 2. Elective. One hour lecture. The details of modern City Forestry practice. Three hours laboratory.—II. Mr. Cox.

## LANDSCAPE ENGINEERING

1. THE APPRECIATION OF LANDSCAPE ARCHITECTURE. 3. Not open to professional students but to all other students of the University. Two hours lecture. One hour reports, etc. The elements and principles of Landscape Design. Lectures and reports.—II. Messrs. Cox, and Arnold.

2. ELEMENTS OF LANDSCAPE ENGINEERING. 4. Elective. Two hours lecture. Four hours drafting. Lectures and drafting practice.—I and II. Messrs. Arnold and Cox.

3. LANDSCAPE DESIGN. 3. Elective. One hour lecture. Six hours drafting, senior year. Elementary design in Landscape Engineering.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 2.

4. LANDSCAPE ENGINEERING CONSTRUCTION. 3. Elective. Two hours lecture. Three hours drafting. Highway design and construction, grading and drainage plans and details of Landscape construction.—I and II. Mr. Cox. Prerequisites: Landscape Engineering 3.

5. CITY PLANNING. 3. Elective. Two hours lecture. With reports and assigned reading. The economic, aesthetic and engineering principles of modern city planning.—I. Mr. Cox.

6. LANDSCAPE ENGINEERING DETAILS. 2. One hour lecture. Three hours drafting. Design of structures used in Landscape Engineering.—I. Messrs. Cox, and Arnold. Prerequisites: Landscape Engineering 2 and 3.

7. LANDSCAPE ENGINEERING DESIGN. Elective. Advanced landscape engineering design for fifth year students.—I and II. Messrs. Cox, and Arnold.

8. DRAFTING AND LETTERING. 2. Elective. Two hours laboratory with four additional hours drafting. Not open to students specializing in Landscape Engineering but for all other students of the College of Forestry.

## DEPARTMENT OF FOREST CHEMISTRY

PROFESSORS WISE AND LIBBY, INSTRUCTOR WESTON

Courses in Forest Chemistry 2 and 3 are required of all students taking the course in Paper and Pulp manufacture. They are open to

properly qualified students in Forestry. All courses in paper and pulp manufacture are required of students entering this field. Forest Chemistry 4 and 6 are open only to properly qualified graduate students.

## FOREST CHEMISTRY

1. GENERAL INORGANIC CHEMISTRY. Required of all Freshmen. Given in the Department of Chemistry of the College of Liberal Arts.—I and II. Mr. Baker and Instructors.

2. ORGANIC CHEMISTRY. 3. P. and P. Sophomore required. Two hours lecture and 4 hours laboratory. This is primarily an elementary course in organic chemistry. Prerequisite: Chemistry 1.—I and II. Mr. Wise.

3. CHEMISTRY OF CELLULOSE. 2. P. and P. Junior required. One hour lecture and three hours laboratory. An elementary course on the chemical and physical properties and the uses of cellulose and its derivatives. Prerequisite: Forest Chemistry 3.—I. Mr. Wise.

4. CHEMISTRY OF CELLULOSE. 2. Graduate elective. Two hours lecture (or seminar). Lecture will cover researches on the constitution, properties, and uses of cellulose and its derivatives. This is essentially a graduate course. Prerequisites: General Chemistry, Qualitative and Quantitative Analysis, Organic Chemistry, and a reading knowledge of German.—II. Mr. Wise.

5. SEMINAR. 1. Elective. One hour weekly. Reports on the recent chemical literature dealing with forest products. Prerequisite: Chemistry 3 or its equivalent.—I and II. Mr. Wise.

6. RESEARCH IN FOREST CHEMISTRY. Graduate elective. Hours to be arranged. Problems in organic chemistry will be assigned to properly qualified graduate students. Prerequisites depend upon the nature of the problem.—I and II. Mr. Wise.

## PULP AND PAPER MANUFACTURE

1. TECHNOLOGY. 3. P. and P. Junior required. Three hours lecture. Study of the processes employed in the manufacture of pulp and paper. Prerequisites or parallel courses. Chemistry 3 and 4, I and II. Mr. Libby.

2. TECHNOLOGY LABORATORY. 2. P. and P. Junior required. Six hours laboratory. Laboratory demonstrations of the principles of pulp and paper manufacture described in Course I. Prerequisite or parallel courses Pulp and Paper 1 and 3. I and II. Mr. Weston.

3. MACHINERY. 3. P. and P. Junior required. Three hours lecture.

Lectures on the design, construction and operation of machinery used in the pulp and paper industry. Prerequisite or parallel courses Physics 1 and P. and P. 1. I and II. Mr. Weston.

4. MILL ANALYSES. 2. P. and P. Junior required. Evaluation of materials used in the manufacture of pulp and paper. Prerequisite or parallel courses Chemistry 3 and 4 and P. and P.—I. Mr. Libby.

5. PAPER TESTING. 2. P. and P. Junior required. Six hours laboratory. Physical, chemical and microscopical characteristics of papers. Prerequisites or parallel courses P. and P. 4.—II. Mr. Libby.

6. BLEACHING. 1. P. and P. Senior required. Three hours laboratory. Experimental demonstrations of the principles involved in bleaching. Prerequisites or parallel courses P. and P. 2 and 4.—I. Mr. Libby.

7. COLORING. 1. P. and P. Senior required. Three hours laboratory. Evaluation and identification of dyestuffs and the development of color formulas for dyeing pulp and paper. Prerequisites or parallel courses P. and P. 4.—II. Mr. Libby.

8. ORGANIZATION. 1. P. and P. Senior required. Methods of organization and administration in typical pulp and paper mills. Prerequisites or parallel courses. P. and P. 1 and 3.—II. Messrs. Libby and Weston.

9. PROBLEM 1. P. and P. Senior required. A report covering a systematic survey of all available literature on some minor problem of interest to the pulp and paper industry. Prerequisites or parallel courses. Pulp and Paper Mfg. 3 and 4. Forest Chem. 2 and 3 and Chem. 3 and 4.—I. Messrs. Wise, Libby and Weston.

10. PROBLEM. 3. P. and P. Senior required. Laboratory development of the problem formulated in course 9. Prerequisite Pulp and Paper Mfg. 9.—II. Messrs. Wise, Libby and Weston.

## DEPARTMENT OF ECONOMICS

\* PROFESSOR CRAFER

1. THE ELEMENTARY PRINCIPLES OF ECONOMICS IN THEIR RELATION TO FORESTRY. 4. Four hours lecture. This course will present those elementary principles of economic science which are essential as an introduction to a more specialized course in forest economics. Lectures, recitations, readings and reports.—II. Mr. Crafer.

5. BUSINESS LAW. 3. Three hours lecture. A general survey of subjects more closely connected with the ordinary transactions of business.—II. Mr. Skerritt.



*Additional Courses in strictly Forestry phases of economics are given by members of the College of Forestry Faculty.*

## FOREST ECONOMICS GROUP

1. ELEMENTARY FORESTRY. 2. Two hours lecture. A synoptical course covering the general principles of forestry and its relation to the broad subject of conservation. This course is an introduction to the professional courses in forestry and touches briefly on the more important subjects covered later in silviculture, management, lumbering, utilization and technology.—I. Mr. N. C. Brown.

2. HISTORY OF FORESTRY. 3. Junior required. Three hours lecture. The development of forestry as influenced by the great epochs in world history with especial reference to Germany, France and the United States. Lectures, recitations and reports.—II. Mr. Lee.

3. FOREST LAWS AND POLICIES. 2. Required of Seniors. Two hours lecture. The object of this course is to gain knowledge of the important laws affecting the National Forests and Public Domain. The forest laws of the principal states engaged in forestry work will be studied in detail. Forest taxation, legislation, administration and state policies will be discussed.—II. Mr. Hoyle.

4. NATIONAL FOREST PRACTICE. 2. Elective. Two hours lecture. Course covering the creation and organization of United States Forest Service; its policies and activities in the protection, administration and development of the National Forests. Mr. Peirce.

5. FORESTRY SEMINAR. 2. Required. Assignment and discussion of current forestry subjects.—II. Mr. Fenska.

## DEPARTMENT OF FOREST RECREATION

PROFESSOR FRANCIS

1. RECREATIONAL USES OF FOREST AREAS. 3. Elective. Two hours lecture. Three hours laboratory. A general course to teach the fundamental principles of the public use of forest areas for recreation and the relation of recreation to other forest uses.—I.

2. DEVELOPMENT OF FOREST PARK RECREATIONAL AREAS. 4. Elective. Two hours lecture. Four hours laboratory. This course first takes up the elements of structural design.—I and II.

3. PROJECTS IN FORESTRY RECREATION. 3. Elective. One hour lecture. Four hours laboratory. A course taking up a study of some of the common problems in forest recreation and their logical solution.—I. Prerequisite: Forest Recreation 2.

4. NATIONAL PARK PRACTICE. 2. Elective. Two hours lecture. A brief history of the policies of the National Park Service.—II.

5. RESEARCH PROBLEMS IN FOREST RECREATION. 3. Elective.—I and II.

## DEPARTMENT OF ENGLISH

ASSISTANT PROFESSOR KNICKERBOCKER

*Course 1 is required of all Freshmen.*

*Course 2 is required of all Sophomores.*

1. ENGLISH. 3. Required Freshman. The principles of expository writing; the sentence; review; punctuation and spelling; the expository paragraph; organization; word study; accuracy; condensation; letter-writing; elements of technical forestry description; long and short themes; class themes. A brief survey of modern English literature is made during the course of the year.—I and II. Mr. Knickerbocker.

2. ENGLISH. 3. Required Sophomore course in literature is divided into two parts: 1. Advanced problems in scientific forestry and professional writing are studied; and 2, a lecture course in the ideals of life in American literature from Franklin to Howells is supplemented by outside reading, class discussion, and quizzes.—II. Mr. Knickerbocker.

## COURSES FOR STUDENTS IN THE COLLEGE OF FORESTRY GIVEN BY ACCESSORY INSTRUCTORS

These courses are given by Departments in the College of Liberal Arts, Applied Science and Fine Arts of the University.

### RHETORIC

4. PUBLIC ADDRESS. 2. Lectures, classroom declamations. Addresses for all occasions are written and delivered. Parliamentary drill. Extemporaneous speaking and criticism.—I. Mr. Kennedy.

5. ADVANCED PUBLIC ADDRESS. 2. Original orations. Platform etiquette.—II. Mr. Kennedy.

### GERMAN

1. ELEMENTARY COURSE. 3. Grammar. Translation from German into English, and elementary exercises in translating into German. Special emphasis on oral work. Mr. Copeland.

3. GRAMMAR AND READING. 3. Oral work and composition.—Mr. Kullmer.

5. SCIENTIFIC GERMAN. 3. Intended to furnish drill in the reading of modern scientific German and is recommended to students pursuing courses in the natural sciences.—II. Mr. Kullmer.

### *FRENCH*

1. ELEMENTARY COURSE. 3. Grammar and reading course. Translation from French into English, and elementary exercises in translating into French. Special emphasis is placed on oral work. Mr. Roe.

2. SCIENTIFIC FRENCH. 3. A reading course designed to meet the needs of students pursuing courses in the natural sciences.—I. Mr. Roe.

### *SPANISH*

1. ELEMENTARY COURSE. 3. Grammar and reading. Translations from Spanish into English and elementary exercises in translating into Spanish. A course designed to meet the needs of forestry students who contemplate service in Central and South America. Mr. Alemany.

2. SCIENTIFIC SPANISH. 3. A reading course designed as a sequel to the elementary course in Spanish. Selected reading from modern scientific text.—I. Mr. Roe.

### *HISTORY*

1. EUROPEAN HISTORY. 2. Recent European History dealing especially with international relations and problems arising from the war. America's position as a world power.—II. Mr. Sperry.

### *MATHEMATICS*

1. TRIGONOMETRY. 3. The solution of triangles with and without logarithms, including the derivation of the necessary formulae; the study of trigonometric functions as functions; the derivation and application of formulae involving the functions of one or more angles; the transformation of expression involving the functions; the solution of trigonometric equations.—I. Messrs. Bryant, and Borgwardt, Mrs. Harwood.

### *BOTANY*

1. RANGE AND GRAZING. 4. Elective. Two hours. Lectures, assigned reading and conference upon range and grazing problems.—II. Mr. Bray. Prerequisites: Forest Botany 1 and 2.

### *GEOLOGY*

1. GENERAL GEOLOGY. 5. Three hours lecture. Four hours laboratory. Lectures, recitations, laboratory and field work.—I. Mr. Eaton.

2. GEOLOGY OF SOILS. 3. Two hours lecture. Two hours laboratory. Geology of Soils. Water and Fertilizers.—II. Mr. Eaton.

4. FOREST PHYSIOGRAPHY 3. Two hours lecture. Two hours laboratory.—II. Mr. Hopkins.

### *PHYSICS*

22. GENERAL PHYSICS. 3. Two hours lecture. Two hours laboratory. Lectures, recitations and laboratory work on mechanics and heat. Mr. Porter.

# THE ROOSEVELT WILD LIFE FOREST EXPERIMENT STATION

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FRANKLIN MOON, M.F., *Dean*

## HONORARY ADVISORY COUNCIL OF THE ROOSEVELT WILD LIFE STATION

### AMERICAN MEMBERS

MRS. CORINNE ROOSEVELT ROBINSON.....	<i>New York City</i>
HON. THEODORE ROOSEVELT.....	<i>Washington, D. C.</i>
MR. KERMIT ROOSEVELT.....	<i>New York City</i>
DR. GEORGE BIRD GRINNELL.....	<i>New York City</i>
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DR. FRANK M. CHAPMAN.....	<i>New York City</i>
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Charles Christopher Adams, Ph.D., Sc.D.,	<i>Director</i>
Alvin Goodnow Whitney, A.B.,	<i>Assistant Director</i>
William Converse Kendall, A.M., M.D.,	<i>Ichthyologist</i>
Wilford A. Dence, B.S.,	<i>Assistant</i>

### COLLABORATORS

Edward R. Warren, B.S.
Richard A. Muttkowski, Ph.D.
Gilbert M. Smith, Ph.D.
Edmund Heller, A.B.
M. P. Skinner, B.S.



In May, 1919, the Legislature of New York passed a Bill instructing the Trustees of The New York State College of Forestry, to establish The Roosevelt Wild Life Forest Experiment Station. This station was created as a Memorial to Theodore Roosevelt for his services for wild life forestry. The duties of the Station are, as defined by the New York law, as follows:

"To establish and conduct an experimental station to be known as 'Roosevelt Wild Life Forest Experiment Station' in which there shall be maintained records of the results of the experiments and investigations made and research work accomplished; also a library of works, publications, papers and data having to do with wild life together with means for practical illustration and demonstration, which library shall, at all reasonable hours, be open to the public."

Furthermore, the duties of the station are to make "investigations, experiments and research in relation to the habits, life histories, methods of propagation and management of fish, birds, game, and food and fur-bearing animals and forest wild life."

This Station will continue the State survey of forest lands and waters which the College has been conducting since 1912 on wild life. Investigations have been made of the fish and fish food of Oneida Lake, the relation of birds to the Adirondack forests, the relation of forest wild life to park visitors in the Palisades Interstate Park, the Allegany State Park, and through gifts of funds and coöperation in the Yellowstone National Park. This kind of work will be extended to other forest lands, and to the game, fur-bearing and other forest animals.

CIRCULAR NO. 42

OF

The New York State  
College of Forestry

AT

SYRACUSE UNIVERSITY

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*Announcement of Courses*

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Published by the University



# CALENDAR

FOR ALL DEPARTMENTS OF THE UNIVERSITY

(Vacation periods are inclusive of the dates given)

## 1924

April	17-23,	<i>Thursday-Wednesday</i> —Easter vacation.
June	6,	<i>Friday</i> —Annual meeting of Trustees, 9 a.m.
	7,	<i>Saturday</i> —Annual meeting of the Alumni Association, 11 a. m.
	8,	<i>Sunday</i> —Baccalaureate sermon, Gymnasium, 10.30 a.m.
	9,	<i>Monday</i> —Commencement, 10 a.m.
June 30 - Aug. 8,		<i>Monday-Friday</i> —Summer Session.
Aug. 11 - Sept. 12,		<i>Monday-Friday</i> —Summer Session, second term.
Aug. 29 - Sept. 12,		<i>Friday-Friday</i> —Summer Surveying Camp.
Sept.	15-17,	<i>Monday-Wednesday</i> —Entrance examinations.
Sept.	16, 17,	<i>Tuesday, Wednesday</i> —Registration for freshmen. (Freshman registration closes 5 p.m. September 17th. Late registrants pay a fine of \$5.00).
Sept.	17-30,	<i>Wednesday-Tuesday</i> —Registration for Extension courses.
Sept.	18,	<i>Thursday</i> —Classes for freshmen begin.
Sept.	18-20,	<i>Thursday-Saturday</i> —Registration of sophomores, juniors and seniors.
Sept.	18-20,	<i>Thursday-Saturday</i> —All classes meet for preliminary arrangements.
Sept.	18-20,	<i>Thursday-Saturday</i> —Supplementary examinations.
Sept.	20,	<i>Saturday</i> —General Assembly, 11 a.m.
Sept.	22,	<i>Monday</i> —First semester begins in all colleges.
Oct.	1,	<i>Wednesday</i> —Extension courses begin.
Nov.	11,	<i>Tuesday</i> —Meeting of Trustees, 9 a.m.
Nov.	26-29,	<i>Wednesday-Saturday</i> —Thanksgiving vacation.
Dec. 20 - Jan. 3,		<i>Saturday-Saturday</i> —Christmas vacation.

## 1925

Jan. 26 - Feb. 7,		<i>Monday-Saturday</i> —Registration for second semester Extension courses.
Jan.	31,	<i>Saturday</i> —First semester ends.
Feb.	2-4,	<i>Monday-Wednesday</i> —Senior week, entrance examinations, registration for second semester.
Feb.	5,	<i>Thursday</i> —Second semester begins.
Feb.	9,	<i>Monday</i> —Second semester Extension courses begin.
Feb.	12,	<i>Thursday</i> —Day of Prayer for Colleges.
April	9-15,	<i>Thursday-Wednesday</i> —Easter vacation.
June	15,	<i>Monday</i> —Commencement, 10 a.m.

# TRUSTEES OF NEW YORK STATE COLLEGE OF FORESTRY

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## EX-OFFICIO

- DR. CHARLES WESLEY FLINT, .....*Syracuse, N. Y.*  
*Chancellor*
- DR. FRANK P. GRAVES, .....*Albany, N. Y.*  
*Commissioner of Education*
- HON. GEORGE R. LUNN, .....*Albany, N. Y.*  
*Lieutenant Governor*
- HON. ALEXANDER McDONALD, .....*Albany, N. Y.*  
*Conservation Commissioner*

## APPOINTED BY GOVERNOR

- HON. LOUIS MARSHALL.....*New York City*
- HON. ALEXANDER T. BROWN.....*Syracuse, N. Y.*
- HON. JOHN R. CLANCY.....*Syracuse, N. Y.*
- HON. HAROLD D. CORNWALL.....*Glenfield, N. Y.*
- HON. GEORGE W. DRISCOLL.....*Syracuse, N. Y.*
- HON. C. C. BURNS.....*Watertown, N. Y.*
- HON. WILLIAM KELLEY.....*Syracuse, N. Y.*
- HON. EDWARD H. O'HARA.....*Syracuse, N. Y.*
- HON. J. HENRY WALTERS.....*New York City*

## OFFICERS OF BOARD

PRESIDENT  
LOUIS MARSHALL

VICE-PRESIDENT  
JOHN R. CLANCY



# FACULTY OF THE NEW YORK STATE COLLEGE OF FORESTRY

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## AT SYRACUSE UNIVERSITY

CHARLES WESLEY FLINT, M.A., D.D., LL.D.

*Chancellor of the University*

WILLIAM PRATT GRAHAM, PH.D.

*Vice-Chancellor of the University*

FRANKLIN MOON, A.B. 1901 (Amherst); M.F. 1909, (Yale).

*Dean of the College; Professor of Silviculture*

MAULSBY WILLETT BLACKMAN, A.B., 1901, A.M., 1902, (Kansas); PH.D. 1905, (Harvard)

*Professor of Forest Entomology*

NELSON COURTLANDT BROWN, B.A. 1906, M.F. 1908, (Yale).

*Professor of Forest Utilization*

LEIGH H. PENNINGTON, A.B., 1907, PH.D. 1909, (Michigan)

*Professor of Forest Botany*

JOHN WALLACE STEPHEN, B.A. 1907, M.F., 1909, (Michigan);  
M.PED., 1915, (Mich. State College)

*Professor of Silviculture*

CHARLES CHRISTOPHER ADAMS, B.S. 1895, (Illinois Wesleyan);  
M.S. 1898, (Harvard); PH.D. 1908, (Chicago); Sc.D. 1920, (Illinois Wesleyan)

*Professor of Forest Zoology; Director of the Roosevelt Wild Life Forest Experiment Station.*

HARRY P. BROWN, A.B., 1909; A.M., 1910; PH.D., 1914, (Cornell)

*Professor of Wood Technology*

LAURIE D. COX, A.B., 1903, (Acadia College); S.B., in Landscape  
Architecture, 1908, (Harvard)

*Professor of Landscape Engineering*

HENRY R. FRANCIS, B.S., 1910, (Massachusetts Agricultural College)

*Professor of Forest Recreation*

LOUIS E. WISE, A.B., 1907; PH.D., 1911, (Columbia)

*Professor of Forest Chemistry*

REUBEN PARKER PRICHARD, B.S., 1907, (Dartmouth); M.F.,  
1909, (Yale)

*Professor of Silviculture*

CLARENCE EARL LIBBY, B.S., in Chemical Engineering. 1916,  
(Maine)

*Professor of Pulp and Paper Manufacture*

JAMES F. DUBUAR, A.B., 1914; M.F., 1915, (Michigan)

*Director and Professor of Forestry, New York State Ranger School.*

EARLE S. PEIRCE, B.S., 1909, (Yale)

*Director of Forest Extension*

GURTH A. WHIPPLE,

*Professor of Forest Extension*

GUSTAV F. LENTZ, PH.B., 1915; M.F., 1917, (Yale)

*Professor of Forest Extension and Director of Forestry Summer  
Camp*

RICHARD R. FENSKA, B.S., 1911, (Beloit); M.F., 1913, (Yale)

*Professor of Forest Engineering*

WILLIAM C. KENDALL, A.B., A.M., 1885, (Bowdoin); M.D., 1896,  
(Georgetown)

*Ichthyologist, Roosevelt Wild Life Forest Experiment Station*

CARLYN CHASE DELEVAN, A.B., 1914; M.S.F., 1915, (Michigan)

*Professor of Forestry at State Ranger School*

CHARLES E. JOHNSON, A.B. 1906, A.M. 1907, PH.D. 1912, (Uni-  
versity of Minnesota)

*Professor of Forest Zoölogy*

HIRAM LEROY HENDERSON, B.S. 1915, (Michigan)

*Assistant Professor of Forest Utilization*

CARL CHESWELL FORSAITH, A.B. 1913, (Dartmouth); A.M.  
1914; PH.D. 1917, (Harvard)

*Assistant Professor of Wood Technology*

HAROLD CAHILL BELYEA, B.A. 1908; M.A. 1911, (Mount Alli-  
son University); B.Sc.F. 1911, University of New Brunswick; M.F.  
1916, (Yale)

*Assistant Professor of Forest Engineering*

ALAN F. ARNOLD, (Landscape Architecture, Harvard, 1904-08)

*Assistant Professor of Landscape Extension*

ALVIN GOODNOW WHITNEY, A.B. 1907, (Dartmouth); 1908-10,  
(Yale Forest School)

*Assistant Director, Roosevelt Wild Life Forest Experiment Station*

WILLIAM S. KNICKERBOCKER, A.B. 1917; A.M. 1918, (Columbia)

*Assistant Professor of English—Registrar.*

DON M. BENEDICT, B.S. 1917, (Michigan)

*Assistant Professor of Forest Botany*

- EDWIN ADOLPHUS HARTLEY, B.S. 1918, (Oregon Agricultural College) ; M.S. 1921, (Ohio State)  
*Assistant Professor of Forest Entomology*
- HARRY E. WESTON, B.S., 1920, (New York State College of Forestry)  
*Assistant Professor of Pulp and Paper Manufacture*
- RAYMOND J. HOYLE, B.S., 1917, (New York State College of Forestry)  
*Assistant Professor of Forest Utilization*
- ROSS ARTHUR WILLIAMS, B.S.F., 1921, (Montana) ; M.F., 1923, (Yale)  
*Assistant Professor of Forestry at the State Ranger School*
- I. LAURENCE LEE, B.S., 1915, M.F., 1919, (Yale)  
*Instructor in Forest Extension*
- CHARLES E. SIFFERLEN, B.S., 1916, (New York State College of Forestry) ; M.F., 1920, (Yale)  
*Instructor in Forest Engineering*
- RAY S. HIRT, B.S., 1917, (Hamline College)  
*Instructor in Forest Botany*
- WILFORD A. DENCE, B.S., 1919, (New York State College of Forestry)  
*Assistant, Roosevelt Wild Life Forest Experiment Station*
- BARNEY A. SARECKY, A.B., 1922, (Syracuse University)  
*Instructor in Forest Zoology*
- JOHN ELTON LODEWICK, B.S., 1919, M.S., 1920, (New York State College of Forestry)  
*Instructor in Wood Technology*
- ROY R. STREETER, 1918, (Bliss Alger School of Business Administration Y.M.C.A. College, Chicago)  
Commercial Instructor, New York State Ranger School.
- HARVEY J. MACALONEY, B.S., 1923, (New York State College of Forestry)  
*Assistant in Forest Entomology*
- EUGENE W. GEMMER, B.S., 1923, (New York State College of Forestry)  
*Assistant in Forest Engineering*
- BURTON L. KASSING, B.S., 1923, (New York State College of Forestry)  
*Homermill Fellow in Pulp and Paper Manufacture*

DOUGLAS C. DEAN, B.S., 1923, (New York State College of Forestry)

*Assistant in Forest Utilization*

BERTRAM D. BARCLAY, B.S., 1923, (College of Wooster)

*Assistant in Forest Botany*

FRED F. FRANKLIN, B.S., 1922, (Purdue)

*Assistant in Forest Botany*

HAROLD W. HEBBLETHWAITE, A.B., 1923, (Syracuse University)

*Assistant in English*

RUBY W. HOWE,

*Secretary to the Dean*

WALTER W. CHIPMAN, B.S., 1893; A.M., 1904, (Wabash)

*Treasurer*

JAMES H. PINKSTONE

*Cashier*

ELEANOR CHURCH, B.L.E., 1916, (Syracuse)

*Librarian*

CECILE CONVERS, B.L.E., 1922, (Syracuse)

*Reference Librarian*

# THE NEW YORK STATE COLLEGE OF FORESTRY

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The act which created The New York State College of Forestry at Syracuse University in 1911 obligates the College to carry on two important and co-ordinate lines of work; first it is to undertake such special research and state-wide investigation in Forestry as will throw light upon and help in the solution of Forest problems which are now confronting the State and the people of New York; second it is the Institution for educational work in Forestry in the State.

## INVESTIGATION AND DEMONSTRATION

In meeting the first obligation of the College of Forestry that is, the carrying on the research and state-wide investigation in Forestry, two small adjacent farms south of the city were purchased in the spring of 1912 and these have been consolidated and designated as The State Forest Experiment Station. Experimental work was begun at this Station in the spring of 1912 and there are growing at present a large number of tree seedlings and transplants as experimental plantings.

The gift of 1800 acres of land in the Adirondacks to the University for Forestry purpose adds greatly to the facilities of the College for the carrying on of very definite lines of experimental and demonstrational work. In 1913 the College purchased 1016 acres of cut-over land in Cattaraugus County and 113 acres in Madison County. These two Forest Stations are located directly adjacent to important lines of railway and have very great value for demonstrational and experimental purposes. Manifestly such facilities as these various pieces of land offer will be of great value in the work of instruction.

## PLAN AND SCOPE OF INSTRUCTION

Instruction in the field of Forestry proper comprises the following:

1. Lectures and field instruction in historical and economical aspects of Forestry for all students of the University desiring a knowledge of the meaning of Forestry.
2. More extended instruction along these lines to those who desire to prepare themselves to give instruction in Forestry in the Public Schools.
3. Instruction and advice by means of lectures throughout the State before High Schools and Granges and other organizations interested in any way in the Conservation of our natural resources; the publication of Bulletins and the giving of expert advice on the ground for the

benefit of owners of hill lands, of farm woodlots and of timber land to enable owners to handle these lands so as to make them much more productive than at the present time.

4. Special service to both producers and consumers of forest products such as special market investigations and studies of closer utilization of waste material as may bring producer and consumer together. Co-operative marketing of farm woodlots and development of market for such by-products of the forest as Christmas trees, burned timber and thinning from sprout growth, already begun by the College.

5. Training of young men in such practical lines of Forestry work as will fit them to fill subordinate positions in the State and National Service. To do this work effectively, a State Ranger School is in operation on the College forest at Wanakena, N. Y. In this School men are trained to fill such positions as Guards, Rangers, Forest Estate Managers, Tree Planting Experts and Nursery Foreman. The year of practical work in the State Ranger School does not necessarily lead to the profession of Forestry.

6. The training of professional Foresters for positions of large responsibility in the State and National Service, or as Forest Experts for private Forest work of any kind.

7. The giving of special technical training to advanced students in Forestry, in Lumbering, Paper and Pulp-making, and other phases of Forest Utilization, in Forest Management, in Dendrological Chemistry, in Forest Entomology, Forest Pathology, Forest Zoölogy, etc.

8. Realizing that the continued advancement of Forestry must rest upon a firmer scientific basis, the College believes that one of its most important functions will consist in the proper training of men so that they will be competent to carry on independent investigations in the various phases of scientific Forestry and in the allied sciences. Leaders of forest research must necessarily have taken graduate work in Forestry in its various aspects.

## FACILITIES FOR INSTRUCTION

In 1913 the State of New York appropriated \$250,000 for a Forestry Building on the Campus of Syracuse University. This was completed during the college year of 1916-1917 and occupied by the College during the second semester. This building is one of the best and most effectively equipped Forestry Buildings in the United States.

The College is unusually well equipped with apparatus for laboratory work in Forest Botany, Pathology, Dendrology, Wood Technology, Zoölogy, Entomology and Pulp and Paper manufacturing, and with instruments for field work in Forest Mensuration and Surveying.



The College has a Forest Library in charge of a graduate librarian and it is being made as complete as possible in literature covering all phases of Forestry and the sciences having a bearing upon Forestry. This library, in connection with the State Forest Experiment Station located south of the city, and the excellent facilities for advanced work offered in the several scientific laboratories of the College should appeal strongly to research students.

### FOREST NURSERY PRACTICE

The State Forest Experiment Station just south of the city offers unusual advantages for instructional work in forest nursery practice and other phases of silviculture.

Besides the Experimental Nursery, the Station has a woodlot of thirty acres which is used for demonstration purposes in the marking of trees for thinning and for underplanting.

### FACILITIES FOR GENERAL FIELD WORK IN FORESTRY

Early in the spring of 1912, 1850 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks was given to the University for Forestry purposes by the Rich Lumber Company of Wanakena, N. Y. This land is very typical of cut-over areas in Northern New York and is splendidly adapted for general Forestry work both for the students of the State Ranger School and for the professional Forestry students. In September, 1912, the State Ranger School was opened on this tract with 16 students and two instructors. The tract is being studied carefully and during 1913 a permanent working plan was made which will be carried out over a long period of time. The School has been designated as a Branch State Weather Station. All of this offers splendid opportunity for the carrying on of research and experimental work. The Sophomore Summer Camp is held each year from June 1 to August 31 on Cranberry Lake.

Besides the gift of the forest land in the Adirondacks, three tracts of land were secured by purchase. The largest of these tracts is a piece of 1016 acres, two hours south of Buffalo in Cattaraugus County and known as the Redhouse Station. The second piece is a tract of 113 acres at Chittenango in Madison County, which was formerly the Experimental Farm of the New York Central Railroad. The third and most important purchase was two small, adjacent farms of a hundred acres just south of Syracuse, lying between South Salina Street and Lafayette Road. This is known as the State Forest Experiment Station and upon it the principle forest nursery of the College is maintained. Every Forestry student is expected to carry through during his course

some definite forest operation, working out the plan and carrying through each operation himself. This will give him the right practical training as well as confidence in carrying on practical work.

## THE CHARLES LATHROP PACK DEMONSTRATION FOREST

The one-thousand-acre Barber tract on Cranberry Lake in the Adirondacks, which for eight years has been the home of the Sophomore Summer Camp, has been purchased by Mr. Pack, President of the American Tree Association, and given to Syracuse University for the use and benefit of the College of Forestry. This splendid property will be known as the "Charles Lathrop Pack Demonstration Forest."

In addition to giving a permanent home to the Summer Camp where 12 weeks practical experience in field methods is given, the Pack Forest will serve as a laboratory for working out of certain problems still unsolved by the forester. Adjoining Cranberry Lake, the State owns thousands of acres of State Preserve, so that with the 1850 acres of College Forest managed by the New York State Ranger School, the Pack Demonstration Forest will be most advantageously located and capable of rendering great service in the training of young foresters to attack the many problems which face this rapidly growing profession.

The location of The New York State College of Forestry at Syracuse is especially favorable to the carrying out of both professional training of students and state-wide educational work. All sections of the Adirondacks are easily accessible by rail. Numerous steam and electric lines radiating in every direction from the city lay the entire region of central and northern New York open to the work of the students. There is no better strategic center with respect to solving the Forestry problems which confront the people of the State.

## PUBLICATIONS

From time to time the College publishes bulletins and studies on various forestry subjects and problems. A list of those already published may be obtained by writing for it to the Director of Forest Extension, care of the College. Most of the bulletins so listed will be sent free on request. The publications of the Roosevelt Wild Life Forest Experiment Station are for limited free distribution, or may be purchased. All communication concerning these publications should be addressed to the Director of the Roosevelt Station.

The College also publishes a News Bulletin concerning its work. This, too, will be sent free to those interested. Names for the mailing lists should be sent to the Director of Forest Extension.

## COMMUNICATIONS

General correspondence concerning the College should be addressed to the Dean of the College of Forestry. Requests for forestry counsel or assistance should also be made to the Dean of the College, or to the professor in charge of the special field in which advice or help is wanted.

Inquiries and correspondence concerning entrance should be addressed to the Registrar of the College of Forestry, Syracuse University.

# GENERAL INFORMATION

## EXPENSES

All bills except for dormitory rooms and board are payable at the Treasurer's office, Forestry Building. Checks should be drawn payable to W. W. Chipman, Treasurer.

### MATRICULATION

Every student on entering the University is required to pay a matriculation fee of \$5.00, which is not returnable. This fee is not required of students passing from one college to another within the University nor of students transferring from another institution if evidence is submitted that such a fee was paid in the former institution. All students entering upon graduate work pay a matriculation fee of \$5.00.

### FEES

All fees for instruction and incidentals are payable twice a year, on or before the first day of each semester. The Treasurer's receipt admits to classes.

Students who at the beginning of the College year, and for at least twelve months prior thereto, have been bonefide residents of the State of New York are exempt from payment of tuition; provided, however, that no student shall be allowed to transfer from the College of Forestry to another College in Syracuse University wherein tuition is charged without first paying \$7.00 per hour for the hours for which he may receive credit in the latter College, with the understanding that from the above amount shall be deducted whatever amount has been collected and retained by the College of Forestry for tuition and fees.

Tuition per year (Non-residents).....	\$100.00
Matriculation (Paid once).....	5.00
Sophomore Summer Camp (Paid once) not including board..	25.00
*Library Deposit (returnable).....	5.00

### PER SEMESTER

Incidentals, Campus fee.....	\$15.00
Student Activities .....	1.75
Daily Orange .....	2.50
Infirmary .....	4.00
Laboratory Fees (all undergraduates) .....	20.00
Laboratory Fees (graduates) .....	25.00

Paper and Pulp students \$10 per semester in addition to regular fees beginning first semester Sophomore year.

Diploma Fee (paid at time of graduation) ..... 10.00

\*The Library Deposit will be returned at time of graduation, or on leaving College, if personal notice is given *before* leaving.

### DORMITORIES

For circular of information and diagrams of dormitories address the Treasurer of the University.

An advance deposit of \$10.00 must be paid by each student at the office of the Treasurer of the University in the Administration Building when room is engaged or reserved. This payment will be credited upon the first term's bill and will be refunded in case the student does not become or remain a student in the University, provided the room is given up before September 1st.

All remaining payments for rooms and board are payable quarterly in advance, as follows: (1) At the beginning of the College year, (2) the first day after Thanksgiving recess, (3) at the beginning of the second semester, (4) the first day after the Easter vacation.

### SELF-HELP

Students who desire temporary or permanent work should confer with the Director of the Appointments Office.

### THE CHARLES LATHROP PACK PRIZE

The Charles Lathrop Pack Foundation was established in 1923 by Mr. Charles Lathrop Pack, President of the American Tree Association, for the purpose of encouraging on the part of students in educational institutions the desire to arouse public interest in forestry and to propagate forestry education among the people. A prize of \$50 will be presented annually to the student or students of the New York State College of Forestry selected by the judges as most worthy of such recognition.

### THE BOY SCOUT SCHOLARSHIP

Through arrangements made with the National Headquarters of the Boy Scouts of America, the College awards each year a Scholarship equal in value to the amount of one hundred dollars to the Boy Scout in the State of New York who is considered most worthy to be the recipient of this honor. Scouts who desire to become applicants for the Scholarship should communicate with Mr. Lorne Barclay, Director of Education, Boy Scouts of America, 200 Fifth Avenue, New York; or

with Professor William S. Knickerbocker, Registrar of the College. Final award is made on the basis of Scout and school records of the applicant.

#### *THE HAMMERMILL FELLOWSHIP IN PULP AND PAPER MANUFACTURING*

The Hammermill Paper Co., through their Chemical Director, Dr. Bjarne Johnson, have established at the college a fellowship for the coming year (September 1923-1924) to be known as the "Hammermill Fellowship in Pulp and Paper Manufacturing." The fellowship carries a grant of \$1200, to the recipient, who must be a graduate student at the college, his work leading to the degree of M. S. Mr. Burton L. Kassing, 105 Grove Place, Utica, N. Y., a member of the 1923 graduating class at the college, has been designated by the company and the college as the recipient of this signal honor.

#### *PHYSICAL TRAINING*

Robust health is necessary to attain high scholarship in college and to perform successfully the duties of later life. With this end in view considerable stress is laid upon well-regulated physical training. Every undergraduate student in the College of Forestry is required to take systematic exercise, including swimming in the gymnasium, during the first year of the course unless physically unable to engage in it.

A medical examination is given every student when he enters upon gymnasium work and his exercises are adapted to the requirements of his health and to the development of a sound body.

#### *ATHLETICS*

The Athletic interests of the University are in the hands of the Athletics Association: All business is transacted through the Athletic Governing Board, which contains representatives from the faculty, the alumni, the students, and interested business men of the city. Through this Association the students support teams in all branches of athletics. The Stadium will accommodate all branches of outdoor athletics with the best possible facilities.

#### *PHOTOGRAPHIC RECORD*

For the purpose of a record of all men who enter the College of Forestry and for historical purposes, the College of Forestry requires a cabinet sized photograph of every man who enters the College either in the courses at Syracuse or in the State Ranger School at Wanakena. The photograph will be required to complete registration.

#### *REQUIREMENTS FOR ADMISSION*

Students entering the regular Course leading to a degree must offer 15 units of preparatory work of High School grade. A unit is con-



sidered to be the equivalent of five recitations per week for one year in one branch of study. Two to three hours of laboratory, drawing or shop work count as equivalent to one hour of recitation. No candidate is eligible for admission to the professional courses if deficient in more than 1 count of entrance conditions. The following subjects are required for admission to The State College of Forestry.

English (four years) . . . . .	3 Units
History (Ancient, Medieval, English, American, or Modern) . . . . .	1 "
Mathematics . . . . .	2½ "

(all applicants must have completed courses in elementary algebra and plane geometry; the extra half unit may be made up by offering a half year's credit in Solid Geometry or in Trigonometry).

Language (Greek, Latin, French, German, or Spanish) . . . . .	2 "
Science . . . . .	3 "
Elective . . . . .	3½ "

(Elective units may be offered for extra courses in the subjects listed above; or in Freehand and Mechanical Drawing; Carpenter Shop or Foundry; Economics; Agriculture. Credit cannot be granted for purely commercial subjects like stenography or typewriting, commercial arithmetic, or business writing.

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Total . . . . . 15 Units

The College in maintaining a high standard of work believes that satisfactory College work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of Forestry and that there is no short cut to the profession. The College urges every young man who is considering the study of Forestry to make up his mind to spend all the time necessary for thorough preparation for College work. If young men before entering College could spend a summer or two or a whole year working in a lumber camp or saw mill or in some manufacturing establishment where wood is used, they would be much better prepared for professional work in Forestry.

Freshmen are accepted only at the beginning of the Fall semester. There is no opportunity to enter at midyear except on advanced standing from some other college.

# UNDERGRADUATE WORK IN THE COLLEGE OF FORESTRY

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## I. THE FOUR YEAR COURSE IN GENERAL FORESTRY LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

This is essentially a general college course in which the student studies Forestry as his major subject. He should realize that it must necessarily fall short of the measure of special training necessary for the professional Forestry degree. It is designed for students who desire a somewhat intimate knowledge of various branches of Forestry for the general satisfaction which such knowledge gives, or for the use they can make of it in a practical way; for those who wish to prepare themselves to teach certain aspects of Forestry in the public schools; or for those who after their college course wish to take subordinate positions in lumbering or manufacturing of forest products or subordinate positions in State or National Forest Service. Such students will not be entitled to the designation of Professional Foresters merely upon the completion of the four years' course.

## II. THE FOUR YEAR COURSE IN PULP AND PAPER MANUFACTURE LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

This course has been established to fill the increasing demand for technical men in the important field of utilization included by the pulp and paper industry. The curriculum of the first year is identical with the general forestry course giving the student the opportunity of determining his future work at the College. The last three years of the course are largely devoted to chemistry, physics, engineering and the technical phases of pulp and paper manufacture. Upon satisfactory completion of the four year program the student should be qualified to enter the pulp and paper industry as a mill control chemist, a technologist in forest products or an operating mill executive.

## III. THE FOUR YEAR COURSE IN LANDSCAPE AND CITY FORESTRY LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

The object of the course is to train men for certain specialized lines of public service which deal with the growing of trees for their aesthetic value, just as the growing of trees for their commercial value is the problem of technical forestry.

The course is aimed primarily at supplying the constantly increasing demand of cities and towns for men with the expert arboricultural knowledge of the forester and the artistic appreciation of the landscape architect, to care for the trees on their streets, parkways and boulevards and in their parks and reservations. Upon graduation, students should be qualified to act as assistants to city foresters, park superintendents or landscape engineers or to act as construction or planting foremen upon any form of landscape or park work or as draftsmen or designers in Landscape, Park or City Planning Organizations.

The care and control of street and park trees is very closely related to park administration and the College aims to make the training so broad that men are prepared for activity in either field.

#### IV. THE FIVE YEAR PROFESSIONAL COURSE LEADING TO THE DEGREE OF MASTERY OF FORESTRY

This course is designed to prepare professional Foresters for higher positions of responsibility in the State Service, the National Forest Service and for the position of expert Forester for private concerns. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man must of necessity build his professional training upon a foundation of general culture. It is the unanimous opinion of the leaders in Forestry education and in the development of Forestry policy in this country, that men who expect to follow the profession of Forestry act unwisely if they try to make a short cut by eliminating the foundation training. The large opportunities awaiting thoroughly trained Foresters fully justify them in devoting the full measure of time advised for preparation. It is advised that every man who takes the four year undergraduate course in the College will go on and complete his fifth year either immediately following the fourth year or after a year or two of practical work.

The fifth year of this five year course is in reality graduate work and subject to the rules governing graduate work in the College of Forestry.

### GRADUATE WORK

Graduate work in the College has been planned with the purpose of training two different types of men—first, the man with a more complete, broad, general training in forestry and, second, the specialist, capable of investigating special economic and scientific problems of forestry. The broad, general training is designed to train men as administrators of state, national or private forests or parks. The large opportunities awaiting thoroughly trained foresters fully justify them

in devoting at least five years of study in preparation. For this reason it is strongly urged that students who have shown proper ability in the four year course in the College return and complete a fifth year either immediately following the fourth year or after a year or two of practical work. This five year course leads to the degree of Master of Forestry.

There are a vast number of technical and scientific problems which must be investigated before forestry really comes into its own in this country and such problems can be solved only by the man who has been specially trained in methods of investigation and who is thoroughly conversant with the research in his own field. The College of Forestry is offering graduate work in all phases of scientific forestry such as silviculture, wood technology, forest pathology, forest entomology, forest zoölogy, forest chemistry, etc.

The graduate work is open not only to graduates of forestry courses but under certain restrictions, mentioned in another place, to men whose undergraduate work has been along other scientific lines. Two degrees are open to men taking such work: Master of Science and Doctor of Philosophy, the requirements of which are given at another place.

## RULES GOVERNING GRADUATE WORK IN THE COLLEGE OF FORESTRY

### *DEGREES OFFERED*

The following degrees will be conferred upon the satisfactory completion of approved schedules of courses and of the other requirements:

Master of Forestry, Master of City Forestry, Master of Science, and Doctor of Philosophy.

It should be understood that the time requirements mentioned below are minimum requirements only. The College does not obligate itself to grant degrees, except upon the completion of all the work in a manner satisfactory to its faculty. The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.

### *MAJORS AND MINORS*

At the time of enrolling, the candidate for a degree shall submit a schedule consisting of not more than 15 semester hours in each semester. This schedule shall be distributed between a major of nine semester hours and two minors of three semester hours each. If so desired, both the major and one minor may be taken in one department or both minors may be taken in one department. This schedule must receive the approval of the graduate committee and the Dean.

*REQUIREMENTS FOR THE DEGREE OF  
MASTER OF FORESTRY*

For the successful prosecution of the work the ability to read German at sight is necessary.

For candidates who are graduates of approved courses in technical forestry a minimum of one year of residence work is required. For graduates in other courses a minimum of two years residence work will be necessary.

A thesis or report showing the candidate's ability to complete satisfactorily an investigation upon a topic connected with the candidate's major study must be submitted to the professor in charge not later than May 1st of the year in which the candidate receives his degree. This, if approved by the professor in charge, and if acceptable to the graduate committee is so endorsed and a copy is deposited in the library.

Upon the acceptance of his thesis the candidate will be notified and provided he has satisfactorily passed written examinations in all his courses he will at the same time be instructed when to appear for an oral examination. This examination will be given by the professors under whom the candidate's work has been taken—the Dean or some member of the graduate committee acting as chairman. Any member of the faculty is privileged to be present. This examination will not take place later than June 1st.

*REQUIREMENTS FOR THE DEGREE OF  
MASTER OF CITY FORESTRY*

A reading knowledge of French is desirable.

For students who are graduates of the course in City Forestry in this College or who have had equivalent courses, a minimum of one complete year of residence work of acceptable grade along approved lines is required.

Similar requirements with regard to thesis and oral examination as for the Master of Forestry degree are in force.

*REQUIREMENTS FOR THE DEGREE OF  
MASTER OF SCIENCE*

For the successful completion of the work, the ability to read German at sight is necessary.

For students who are graduates in forestry of this institution or others of a similar grade, a minimum of one year of residence work of an acceptable grade is desired.

Students who are graduates in lines other than forestry may be recommended for their degree on the completion of one year of satisfactory



residence work provided he has taken at least one minor in forestry. *The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.*

Similar requirements are made as regards thesis and oral examinations as for the preceding two degrees.

### REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

A candidate must be a graduate of a college of approved standing and his undergraduate standing must have been such as to fit him to pursue advanced work in the subject which he chooses as his major. Before beginning the second year of graduate work the candidate must demonstrate his ability to read scientific German and French at sight.

In case the candidate holds merely the Bachelor's degree a minimum of three years' graduate work is required. One years' residence in graduate work at another college may be substituted with the approval of the Dean and graduate committee.

At the time of enrolling, the candidate must choose the major study and two minor studies subject to the same rules as those governing other graduate work. If the candidate is not a graduate in forestry at least one of these minors during two years of his course must be in forestry.

A thesis demonstrating the results of scientific research upon a topic bearing upon his major subject must be completed and receive the approval of the major professor not later than May 1st of the year in which the degree is granted. This must be satisfactory to the Dean and graduate committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the College library.

The candidate is required to pass two examinations, both oral. The preliminary examination will be upon the subjects covered by his major and minors. The final examination will be upon the candidate's thesis.

## VI. TRAINING IN THE STATE RANGER SCHOOL

The State Ranger School gives a practical course of one year which trains men very thoroughly for such positions as forest guard, forest ranger, forest estate manager, tree planting expert and nursery foreman. The work is largely of a practical nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of various methods of logging and lumbering and nursery practice and tree planting. It is to be understood that this practical training is not an education in Forestry and that upon completion of the course a man



will not be a trained Forester. A certificate is given after completion of a year of satisfactory work in the school and a diploma following a year of satisfactory practice. A special bulletin of the Ranger School will be sent upon request. Address: Director James F. Dubbar, New York State Ranger School, Wanakena, N. Y.

### PROGRAM OF COURSES IN GENERAL FORESTRY FRESHMAN YEAR

FIRST SEMESTER		SECOND SEMESTER	
Elementary Forestry	2 hrs.	English	3 hrs.
English 1	3 "	Forest Zoölogy 1	3 "
Mathematics 1	3 "	Chemistry 1	3 "
Botany 1	3 "	Botany 2	4 "
Chemistry 1	3 "	Modern Language	3 "
Modern Language	3 "		
	17 hrs.		16 hrs.

### SOPHOMORE YEAR

FIRST SEMESTER		SECOND SEMESTER	
Wood Technology 1	5 hrs.	Engineering 2	5 hrs.
Engineering 1 or Physics	3 "	Engineering 1 or Physics	3 "
Silviculture 2	3 "	Geology 2	3 "
Geology 1	3 "	Entomology 1	3 "
English 2	3 "	Wood Technology 1	3 "
	17 hrs.		17 hrs.

SOPHOMORE SUMMER CAMP, ON CRANBERRY LAKE IN THE ADIRONDACKS, JUNE 1 TO AUGUST 31. Required of all students in Forestry. Prerequisites: Silviculture II., Wood Technology I., Engineering I. and II., Botany I. and II., Entomology I. Instruction by members of the various departments. No Junior who has not had the prescribed engineering at the summer camp will be permitted to take Engineering III.

## JUNIOR YEAR

FIRST SEMESTER		SECOND SEMESTER	
Engineering 3	3 hrs.	Silviculture 3	3 hrs.
Wood Technology 3	3 "	Botany 3	3 "
Botany 6	3 "	Economics 1	3 "
Utilization 1	3 "	Forest History	3 "
Electives	6 "	Electives	6 "
	18 hrs.		18 hrs.
ELECTIVES—FIRST SEMESTER		ELECTIVES—SECOND SEMESTER	
German 5		Forest Chemistry 2	
Utilization 2		Forest Geology 4	
Qualitative Analysis		Utilization 4, 8	
Forest Entomology 2, 3, 11, 12		Qualitative Analysis	
Forest Zoölogy 2, 3, 4, 6, 11		Wood Technology 3, 4, 5	
Wood Technology 2		Forest Entomology 13, 14, 15, 17	
Arboriculture 1		Forest Zoölogy 3, 4, 5, 11	
Landscape Engineering 2, 6		Arboriculture 1, 2	
Botany 11		Landscape Engineering 2, 6	
French 2		Silviculture 1	
Spanish 2		Forest Recreation 1, 2	
Engineering 5			
Silviculture 3			
Forest Chemistry 2			
Forest Recreation 1, 2			

## SENIOR YEAR

FIRST SEMESTER		SECOND SEMESTER	
Engineering 4	3 hrs.	Utilization 5	1 hr.
Business Law	2 "	Rhetoric	2 "
Silviculture 4	4 "	Silviculture 5	2 "
Electives	8 "	Forestry Seminar	2 "
		Forest Laws and Policies	2 "
		Electives	9 "
	17 hrs.		18 hrs.

ELECTIVES	ELECTIVES
Pulp and Paper Manufacturing, 1	Forest Utilization 3, 9, 10, 11
Forest Recreation 2, 3	Pulp and Paper Manufacturing, 1
Forest Botany 7, 8	Wood Technology 5
Botany 19	Forest Recreation 2, 4
Forest Entomology 2, 11, 12, 15, 16	Forest Botany 8, 10
Forest Zoölogy 2, 3, 4, 5, 6, 11	Range Grazing
Landscape Engineering 3, 4, 5	Botany 19
Engineering 5	Forest Zoölogy 3, 4, 5, 11
Utilization 6, 7, 9	Forest Entomology 13, 14, 15, 17
National Forest Practice	Arboriculture 3, 4
Wood Technology 6	Landscape Engineering 3, 4
Forest Chemistry 3	Engineering 6, 7
Qualitative Analysis	Silviculture 6
	Qualitative Analysis

## SCHEDULE FOR PULP AND PAPER COURSE

1922-1923

## FRESHMAN YEAR

FIRST SEMESTER	SECOND SEMESTER
General Forestry 2 hrs.	Forest Zoölogy I 3 hrs.
English I 3 "	English I 3 "
Forest Botany I 3 "	Forest Botany II 4 "
German I 3 "	German I 3 "
Chemistry I 3 "	Chemistry I 3 "
Math. I, Trigonometry 3 "	
	16 hrs.
17 hrs.	

## SOPHOMORE YEAR

Wood Technology 5 hrs.	Wood Technology I 3 hrs.
Physics I 4 "	Physics I 4 "
Chem. III, Qualitative 3 "	Chem. III, Qualitative 3 "
Mechanical Drawing IV 2 "	Mechanical Drawing V 2 "
Math. II, Algebra 3 "	Math. III, Analytics 3 "
	English II 3 "
17 hrs.	18 hrs.

THREE MONTHS SUMMER WORK IN A PULP OR  
PAPER MILL  
JUNIOR YEAR

Rhetoric XV, Public Speaking	3 hrs.	Economics I	3 hrs.
Forest Chem. II, Organic	3 "	Forest Chem. II, Organic	3 "
Chem. CIV, Quantitative	3 "	Chem. CIV, Quantitative	3 "
Pulp & Paper Mfg. I, Tech.	3 "	Pulp & Paper Mfg. I, Tech.	3 "
Pulp & Paper Mfg. II, Lab.	2 "	Pulp & Paper Mfg. II, Lab.	2 "
Pulp & Paper Mfg. III, Mach.	3 "	Pulp & Paper Mfg. III, Mach.	3 "
Pulp & Paper Mfg. IV, Mill Analyses	2 "	Pulp & Paper Mfg. V, Paper Testing	2 "
	19 hrs.		19 hrs.

THREE MONTHS SUMMER WORK IN A PULP OR  
PAPER MILL  
SENIOR YEAR

Economics VII	3 hrs.	Wood Technology IV	3 hrs.
Wood Technology III	3 "	Mechanical Engineering	3 "
Electrical Engineering	3 "	Pulp & Paper Mfg. VII, Coloring	2 "
Pulp & Paper Mfg. VI, Bleaching	1 "	Pulp & Paper Mfg. X, Problem	4 "
Pulp & Paper Mfg. IX, Problem	2 "	Pulp & Paper Mfg. VIII, Organization	2 "
Forest Chemistry III, Cellulose	3 "	Business Law I	2 "
Business Law I	2 "		16 hrs.
	17 hrs.		

DESCRIPTION OF COURSES IN THE COLLEGE  
OF FORESTRY

Note—A numeral following the title of the course indicates the number of credit hours a week. A credit hour means one recitation (or lecture) hour per week. Three laboratory hours are equivalent to one credit hour. All courses extend through the year unless followed by a Roman numeral, which limits the subject to the semester named.

*Course open to all students of the University.*

FORESTRY. 1a. GENERAL FORESTRY. 3. Three hours lecture. Place of forestry in the life of State and Nation. This is a synoptical course designed to give a general survey of the subject of forestry and other phases of conservation. Not open to students in the State College of Forestry but to all others.—I. Mr. Stephen.

SILVICULTURE. 1a. FARM FORESTRY. 3. Three hours lecture. Development and management of the farm woodlot. Utilization of idle lands for the production of wood for local uses. Open to all students of the University except those in the College of Forestry.—II. Mr. Stephen.

LANDSCAPE ENGINEERING. 1. 3. Three hours lecture. Appreciation of Landscape Architecture. The principles of art which underline landscape design. The more important historical styles of gardening. Open to men and women in the University.—II. Mr. Cox, and Mr. Arnold.

## DEPARTMENT OF SILVICULTURE

PROFESSORS STEPHEN AND PRITCHARD

SILVICULTURE. I. FARM FORESTRY. 3. Elective. Three hours lecture Development and management of the farm woodlot.—I. Mr. Pritchard.

SILVICULTURE. II. ELEMENTARY SILVICULTURE. 3. Two hours lecture. Three hours laboratory. Effect of environment on tree development, the forest as a society, the effect of the forest on the site, the effect of the site on the forest, moisture conditions within and without the forest, the effect of forests on temperature, soil, etc.—I. Mr. Stephen.

SILVICULTURE. III. SEEDING AND PLANTING. 3. Two hours lecture. Three hours laboratory. A course dealing with all phases of forest propagation especially by seeding and planting.—II. Mr. Pritchard.

SILVICULTURE. IV. SILVICULTURAL SYSTEMS. 4. Three hours lecture. Eight hours field. Methods of reproduction of forests as bearing upon silvicultural systems used in this country and abroad, and directions for marking to obtain these results.—I. Mr. Stephen.

SILVICULTURE. V. FOREST PRODUCTION. 2. Two hours lecture. Protection of forests from fire, wind, frost, animals, and other destructive agencies.—II. Mr. Pritchard.

SILVICULTURE. VI. SILVICULTURAL SEMINAR. Elective. Two hours conference and discussion of silvicultural problems. Designed to give the students a thorough review of the literature on silviculture.—II. Messrs. Stephen and Pritchard.

SILVICULTURE. XI. EXPERIMENT STATION PROBLEMS. Elective. Three hours. Organization, supervision, opportunities, training, methods and results of silvicultural research. This course is intended to equip a student for carrying on research work in silviculture.—I. Mr. Stephen.

SILVICULTURE. XII. REGIONAL STUDIES. Elective. Two hours. Silvicultural methods applied in the management of the important species in the different forest regions.—I. Messrs. Stephen and Pritchard.

SILVICULTURE. XXI. ADVANCED SILVICULTURAL PRACTICE. Elective. Two hours lecture. Special problems in the practice of silviculture in this country and abroad.—II. Messrs. Stephen and Pritchard.

SILVICULTURE. XXII. RESEARCH IN SILVICULTURE. Elective.—I and II. Messrs. Stephen and Pritchard.

## DEPARTMENT OF WOOD TECHNOLOGY

PROFESSOR H. P. BROWN, ASSISTANT PROFESSOR C. C. FORSAITH,

INSTRUCTOR J. E. LODEWICK.

*Courses 1 and 3 are required of all undergraduates.*

*Courses 2, 4, 11, and 12 are elective for graduates and undergraduates.*

*Course 21 is for graduates only.*

1. ELEMENTARY DENDROLOGY. 8. Required Sophomore. Five hours the first semester, 3 hours lecture, 1 hour recitation, and 3 hours laboratory; 3 hours the second semester, 2 hours lecture, 3 hours laboratory. Studies in the Identification and Taxonomy of Woody Plants with especial reference to the species native to New York State, and other important Forest Regions of the United States and abroad. Studies of the silviculture characteristics and the Forest Regions are included.—I and II. Mr. Lodewick.

2. ORNAMENTAL WOODY PLANTS. 3. Elective. One hour conference and 6 hours Laboratory. The Identification and Taxonomy of ornamental woody plants. (Prerequisite—Wood Technology I.)—I. Mr. Forsaith.

3. WOOD TECHNOLOGY. 3. Required Junior. First Semester. Two hours lecture and 3 hours laboratory. A study of the structural, physical, and chemical properties of wood. Identification of woods by gross and microscopic structure. (Prerequisite—Wood Technology I.)—I required and II elective. Mr. Forsaith.

4. TEXTILE FIBRES. 3. Elective. One hour lecture and 6 hours laboratory. A taxonomic survey of the textile fibres of commerce, including botanical source, supply, treatment, and identification. (Prerequisites—Wood Technology I and III.)—II. Mr. Lodewick.

11. ADVANCED HISTORICAL MORPHOLOGY. 3. Elective. One hour lecture and 5 hours laboratory. An evolutionary and practical study of prehistoric and modern woody plants. (Prerequisites—Wood Technology I and III.)—II. Mr. Forsaith.



12. THE MICROTECHNIQUE OF WOOD TISSUE. 3. Elective. One hour lecture and 6 hours laboratory. Preparation of wood for sectioning, the technique of staining, the use of the microtome, and the practice of photography in relation to wood technology. (Prerequisites—Wood Technology I and III.)— Mr. Lodewick.

21. RESEARCH IN DENDROLOGY AND WOOD TECHNOLOGY. Elective for graduates. Hours to be arranged. Mr. Forsaith.

## DEPARTMENT OF FOREST ENGINEERING

PROFESSOR FENSKA, ASSISTANT PROFESSOR BELYEA,

INSTRUCTOR SIFFERLEN, ASSISTANT GEMMER

*Courses 1, 2, 3, and 4 required of all undergraduates.*

*Summer Camp Engineering is also required.*

*Courses, 5, 6, and 7 elective to graduates and undergraduates.*

1. PLANE SURVEYING. 3. Required Sophomore. One hour lecture. Six hours field work. A preliminary course in the use of surveying instruments and field methods. Lettering, mapping and office computations.—I or II. Messrs. Fenska, Sifferlen, and Gemmer.

2. FOREST MENSURATION. 5. Required Sophomore. Three hours lecture. Eight hours field work. A study of the measurements of volume of logs, tree and forest; estimating and mapping of timber, compilation of volume tables and collection of data in a detailed study of a forest area by stem analysis for purpose of predicting future possibilities.—II. Messrs. Sifferlen and Gemmer.

The above courses are prerequisite for the Sophomore Summer Camp.

3. TOPOGRAPHIC SURVEYING. 3. Required Junior. One hour lecture. Six hours field work. Methods of topographic mapping, by aneroid and pacing, transit and stadia, abney level and slope chain, plane table with telescopic alidade, and trigonometric leveling.—I. Messrs. Fenska, Sifferlen, and Gemmer.

Prerequisite—Summer Camp Engineering.

4. FOREST REGULATION. 3. Required Senior. Three hours lecture. Organization of forests for management. The normal and empirical forest, rotation and methods of regulating the cut.—I. Mr. Belyea.

5. FOREST INCREMENT. 3. Elective. Two hours lecture, one laboratory period. A continuation of Forest Mensuration as applied to the principles of determining increment and yields.—I. Mr. Belyea.

6. FOREST MANAGEMENT. 3. Elective. Three hours lecture. The scope of forest management in relation to other subjects in forestry. The fundamentals affecting the policies of forest management under national, state, corporate and private ownership.—II. Mr. Belyea.

7. FOREST ENGINEERING. 3. Elective. Three hours lecture. The application of engineering principles in the construction of trails, roads, bridges, logging railroads, chutes, flumes, dams, telephone line, fire towers, cabins, etc. for the development and proper utilization of a forest.—II. Mr. Fenska.

21. ADVANCED FOREST MANAGEMENT. Elective for Graduate Students only. Individual study of an assigned problem in Forest Management, Hours to be arranged,—I and II. Mr. Belyea.

## DEPARTMENT OF FOREST UTILIZATION

PROFESSOR N. C. BROWN, ASSISTANT PROFESSORS HENDERSON  
AND HOYLE, AND ASSISTANT DEAN.

*Courses 1 and 5 are required of all undergraduates.*

*Courses 2, 3, 4, 6, 8, 9, 10 and 11 are elective to graduates and undergraduates who have prerequisites.*

1. LUMBERING. 3. Three hours lecture. Required of Juniors. History and development of the lumber industry and its relation to forestry. Detailed studies of logging, transportation and milling. Utilization 5 supplements this course and is required of all students taking Utilization —I. Mr. Brown.

2. PORTABLE MILLING AND WOODLOT LOGGING. 1. Elective, Juniors. The principles and practice of portable mill work and intensive logging and utilization.—I. Mr. Henderson.

3. WOOD PRESERVATION. 3. Two hours lecture and field trips. Elective, Juniors. Wood preservatives and methods of treatment. Prerequisites: Wood Technology I and III.—II. Mr. Henderson.

4. FOREST PRODUCTS. 3. Elective, Juniors or Seniors. Three hours lecture. A study of the so-called minor forest products such as veneer paper pulp, cooperage, maple sugar, wood distillation, etc.—II. Mr. Brown.

5. FIELD LUMBER STUDY. Following the prerequisite course in Utilization 1, a trip of two weeks to a month's duration is taken either individually or in a party to study the methods of logging and lumber manufacture.—II. Messrs. Brown, Henderson and Hoyle.

6. REGIONAL STUDIES IN LOGGING AND MILLING. 3. Elective, Seniors. Three hours. A detailed study will be made to supplement elementary course in Lumbering (Utilization).—I. Messrs. Brown, Henderson and Hoyle.

11. LUMBER SALESMANSHIP. 2. Two hours lecture. Elective, Seniors or graduates. Second Semester. The principles underlying salesmanship with particular reference to lumber, and their application in the American lumber industry.—II. Mr. Hoyle.

12. BUSINESS METHODS IN THE LUMBER INDUSTRY. 3. Elective Seniors. Three hours lecture. A review of particular problems affecting the marketing of lumber.—II. Mr. Brown.

13. AMERICAN LUMBER EXPORT TRADE. 2. Two hours lecture. Elective, Seniors or graduates. Second Semester. A study of export methods, ocean shipping, foreign finance and the present and future markets for American Lumber. Mr. Brown.

14. DRY KILN ENGINEERING. 3. Elective, Seniors or Graduates. One hour lecture and six hours laboratory. Consisting of a study of the theoretical and practical application of kiln drying of wood products. Landscape VIII, prerequisite.—I. Mr. Henderson.

21. SPECIAL PROBLEMS IN UTILIZATION. Elective for Seniors and graduates. Conferences and special library and laboratory research in the lumber and associated industries. Credit hours to be arranged. Messrs. Brown, Henderson and Hoyle.

## DEPARTMENT OF FOREST BOTANY

PROFESSOR PENNINGTON, ASSISTANT PROFESSOR BENEDICT,

INSTRUCTOR HIRT, ASSISTANTS BARCLAY AND FRANKLIN.

*Courses 1, 2, 3, 6 required of undergraduates.*

*Courses 11, 12, 13, 14 elective for graduates or undergraduates.*

*Course 21 for graduates only.*

Students who wish to take special work in Forestry Pathology should elect Course 11, the first semester of the junior year.

1. FOREST BOTANY. 3. Required Freshman. Two hours lecture. Three hours laboratory. An elementary course throughout the first year dealing with structure and functions of plants and the fundamental problems of Botany, together with a general survey of the plant kingdom.—I. Messrs. Pennington, Benedict, Hirt, Barclay and Franklin.

2. FOREST BOTANY. 4. Required Freshman. A continuation of Forest Botany. I.—II. Messrs. Pennington, Benedict, Hirt, Barclay and Franklin.

3. PLANT PHYSIOLOGY. 3. Required Junior. Lectures, recitations, and laboratory. A course designed to teach the fundamental physiological processes involved in growth of plants.—II. Mr. Benedict. Prerequisites: Courses 1 and 2.

6. FOREST PATHOLOGY. 3. Required Junior. One hour lecture. Six hours laboratory. A course of lectures and laboratory work upon the diseases of plants in general with especial emphasis upon diseases of trees.—I. Messrs. Pennington and Benedict. Prerequisites: Courses 1, 2, and 3.

11. GENERAL MYCOLOGY. 3. Elective. One hour lecture. Four to six hours laboratory. A course in the structure and life histories of fungi.—I. Mr. Benedict. Prerequisites: Courses 1, 2, and 3.

12. ADVANCED FOREST PATHOLOGY. 3. Elective. One hour lecture. Six hours laboratory.—I. and II. Mr. Pennington. Prerequisites: Courses 6 and 7.

13. CULTURE METHODS. 3. Elective. Six hours laboratory and conference. A study of technique in the isolation and pure culture of fungi.—II. Mr. Benedict. Prerequisites: Courses 6 and 8.

14. ADVANCED MYCOLOGY. 3. Elective. A year course in the classification of fungi.—I. and II. Mr. Pennington.

21. RESEARCH IN FOREST BOTANY AND PATHOLOGY. Elective for graduates.—I and II. Messrs. Bray and Pennington.

## DEPARTMENT OF FOREST ENTOMOLOGY

PROFESSOR BLACKMAN, ASSISTANT PROFESSOR HARTLEY,

ASSISTANT MACALONEY.

*Course 1 is required of all undergraduates in Forestry.*

*Courses 2 and 3 are optional for Juniors and Seniors.*

*Courses 11, 12, 13, 14, 15, 16 and 17 may be taken either as special undergraduate work or as minors in the graduate courses.*

*Course 21 can be taken only as major graduate work.*

1. ELEMENTARY ENTOMOLOGY. 3. Required Sophomore. Two hours recitation. Three hours laboratory. A general course devoted to the study of the morphology, life histories, and general classification of insects.—II. Messrs. Blackman, Hartley, MacAloney, and Assistants. Forest Zoölogy 1 is prerequisite for this course.

2. FOREST ENTOMOLOGY. 3. Elective. Two hours lecture. Three hours laboratory. Devoted to a study of those insects of economic importance in Forestry.—I. Mr. Blackman, Mr. MacAloney and Assistants. Course 1 is prerequisite.

3. INSECTS AFFECTING SHADE TREES AND ORNAMENTAL SHRUBS. 3. Elective. Two hours lecture. Three hours laboratory. Intended primarily for students specializing in City Forestry.—I. Mr. Hartley. Course 1 is prerequisite.

11. ADVANCED FOREST ENTOMOLOGY. 3. Elective. One hour conference. six hours laboratory or field. Consisting of laboratory work, field work and library investigation.—I. or II. Mr. Blackman. Courses 1 and 2 are prerequisite.

12. INSECT ANATOMY. Elective. A more detailed study of the anatomy of certain insects not studied in previous courses. Messrs. Blackman, and Hartley.

13. INSECT TAXONOMY. Elective. A more detailed study of the classification of some particular group of insects. Mr. Blackman.

14. INSECT HISTOLOGY. Elective. A study of the tissues and microscopic anatomy of insects and the methods used in the preparation of insect material for microscopic study. Mr. Blackman.

15. PROBLEMS IN FOREST ENTOMOLOGY. Elective. Individual study of small problems in forest entomology.—I or II. Messrs. Blackman and Hartley.

16. SEMINAR. 2 hours. Elective. Library investigation, reports and discussion of forest insects of great economic importance. Two hours conference per week. By appointment.—I or II. Mr. Blackman.

17. INSECT ECOLOGY. 3 hours. Elective. Two hours lecture. Three hours laboratory or field. A study of the various interacting environmental or habitat factors which influence the relative abundance and distribution of insects; and the practical application of ecological principles to problems in forest entomology. By appointment.—I or II. Mr. Hartley.

21. RESEARCH PROBLEMS IN FOREST ENTOMOLOGY. Elective. For graduate students.—I and II. Mr. Blackman.

## DEPARTMENT OF FOREST ZOOLOGY

PROFESSOR ADAMS, PROFESSOR JOHNSON, INSTRUCTOR SARECKY.

*Zoölogy 1 is required of all freshmen.*

*Zoölogy 2, 3, 4, 5, 6, 11 are open to Juniors and Seniors and Graduates.*

*Zoölogy 21 is open only to Graduates.*

These courses are designed as a training in the scientific principles underlying the relation of animals to forest lands and waters, and national and state parks, and the application of these principles to the economic and social problems concerned with birds, fish and game, and fur-bearing and other forest animals.

1. GENERAL ZOÖLOGY. 3. Required. Freshman. Two hours recitation. Three hours laboratory. A course in general principles of Zoölogy.—II. Mr. Johnson and Mr. Sarecky.

2. FISH AND GAME. 3. Elective. One hour lecture. Six hours laboratory or field. A course devoted primarily to a study of the relation of fish, game, and forest animals to forestry, emphasizing the economic and social aspects of the problem.—I. Mr. Adams. Prerequisite: Zoölogy 1 or equivalent and Entomology 1.



3. ECOLOGY OF FRESH WATER ANIMALS. 3. Elective. One hour lecture. Six hours laboratory or field. This course is intended to give a scientific foundation for the application of animal ecology to the aquatic life of the lakes and streams of forests lands and parks. Mr. Adams. Prerequisite: Zoölogy 2.

4. ECOLOGY OF FOREST ANIMALS. 3. Elective. One hour lecture. Six hours laboratory or field. This course is complementary to the preceding and is devoted to a training in the scientific foundations and the application of ecology to the land animals of coniferous and hardwood forests and parks. Mr. Adams. Prerequisite: Zoölogy 2.

5. NATURAL HISTORY OF NATIONAL PARKS AND PRESERVES. 3. Elective. One hour lecture and six hours in laboratory or field. A study of the theory and practice of the principles underlying the appreciation and care of the natural history resources, mainly animals, of National Parks and State and private wild life preserves. Open to Juniors and Seniors.—II. Mr. Adams.

6. GRAZING AND PREDATORY CONTROL. 3. Elective. Two hours lecture. Three hours laboratory or field. Intended to show the relation of grazing to forest management, including predatory animal and rodent control, particularly in National Forests, Prerequisites: Zoölogy 1 and 2.—I. Mr. Johnson.

11. PROBLEMS IN FOREST ZOÖLOGY. Elective; hours to be arranged. Individual study of special forest zoölogy problems. Mr. Adams and Mr. Johnson. Prerequisites: Zoölogy 1 and 2.

21. ECOLOGICAL RESEARCH IN FOREST ZOÖLOGY. Elective. For graduate students.—I. and II. Mr. Adams and Mr. Johnson.

## DEPARTMENT OF LANDSCAPE ENGINEERING

PROFESSOR COX, ASSISTANT PROFESSOR ARNOLD

### ARBORICULTURE

1. PLANT MATERIALS. 3. Elective. Three hours lecture. With occasional field trips and preparation of planting plans. This course covers deciduous and evergreen shrubs, vines and perennials.—I. and II. Mr. Arnold.

2. PRUNING AND CARE OF TREES. 3. Elective. Two hours lecture. Two hours laboratory.—II. Mr. Cox.

3. SHADE AND ORNAMENTAL TREES. 3. Elective. Two hours lecture. Deciduous and evergreen trees used for shade or ornamental purposes—their identification and use.—II. Mr. Arnold. Prerequisite: Arboriculture I.



STREET TREE PLANTING. 2. Elective. One hour lecture. Three hours laboratory. The details of modern City Forestry practice.—II. Mr. Cox.

3. SHADE AND ORNAMENTAL TREES 2. Elective Two hours lecture.

### LANDSCAPE ENGINEERING

1. THE APPRECIATION OF LANDSCAPE ARCHITECTURE. 3. Not open to students of the College of Forestry but to all other students of the University. Three hours lecture. The elements and principles of Landscape Design. Lectures and reports.—II. Messrs. Cox and Arnold.

2. ELEMENTS OF LANDSCAPE ENGINEERING. 3. Elective. Two hours lecture. Three hours drafting. Lectures and drafting practice.—I. and II. Messrs. Arnold and Cox.

3. LANDSCAPE DESIGN. 3. Elective. Nine hours drafting, with occasional lectures, senior year. Elementary design in Landscape Engineering.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 2.

4. LANDSCAPING ENGINEERING CONSTRUCTION. 3. Elective. Two hours lecture. Three hours drafting. Highway design and construction, grading and drainage plans and details of Landscape construction.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 3.

5. CITY PLANNING. 3. Elective. Two hours lecture. One hour reports and assigned reading. The economic, aesthetic and engineering principles of modern city planning.—I. Mr. Cox.

6. DRAFTING AND LETTERING. 3. Elective. Two hours laboratory with additional hours drafting. Not open to students specializing in Landscape Engineering but for all other students of the College of Forestry.

21. LANDSCAPE ENGINEERING DETAILS. 2. One hour lecture. Three hours drafting. Design of construction used in Landscape Engineering.—I. Messrs. Cox, and Arnold. Prerequisite: Landscape Engineering 2 and 3.

22. LANDSCAPE ENGINEERING DESIGN. Elective. Advanced landscape engineering design for fifth year students.—I and II. Messrs. Cox and Arnold.

### DEPARTMENT OF FOREST CHEMISTRY

PROFESSORS WISE AND LIBBY, ASSISTANT PROFESSOR WESTON,  
ASSISTANT KASSING (HAMMERMILL FELLOW).

Courses in Forest Chemistry 2 and 3 are required of all students taking the course in Paper and Pulp manufacture. They are open to properly qualified students in Forestry. All courses in paper and pulp manufacture are required of students entering this field. Forest Chemistry 12 and 21 are open only to properly qualified graduate students.

## FOREST CHEMISTRY

1. GENERAL INORGANIC CHEMISTRY. Required of all Freshmen. Given in the Department of Chemistry of the College of Liberal Arts.—I and II. Mr. Baker and Instructors.

2. ORGANIC CHEMISTRY. 3. P. and P. Sophomore required. Two hours lecture and 3 hours laboratory. This is primarily an elementary course in organic chemistry. Prerequisite: Chemistry 1.—I and II. Mr. Wise.

11. CHEMISTRY OF CELLULOSE. 3. P. and P. Junior required. Three hours lecture. An elementary course on the chemical and physical properties and the use of cellulose and its derivatives. Prerequisite: Forest Chemistry 2.—I. Mr. Wise.

12. CHEMISTRY OF CELLULOSE. 2. Graduate elective. Two hours lecture (or seminar). Lecture will cover researches on the constitution, properties, and uses of cellulose and its derivatives. This is essentially a graduate course. Prerequisites: General Chemistry, Qualitative and Quantitative Analysis, Organic Chemistry, and a reading knowledge of German.—II. Mr. Wise.

13. SEMINAR. 1. Elective. One hour weekly. Reports on the recent chemical literature dealing with forest products. Prerequisite: Chemistry 3 or its equivalent.—I and II. Mr. Wise.

21. RESEARCH IN FOREST CHEMISTRY. Graduate elective. Hours to be arranged. Problems in forest chemistry and organic chemistry will be assigned to properly qualified graduate students. Prerequisites depend upon the nature of the problem.—I and II. Mr. Wise.

## PULP AND PAPER MANUFACTURE

Special bulletin describing the work of the paper and pulp course may be obtained by writing for it to the Registrar of the College.

1. TECHNOLOGY. 3. P. and P. Junior required. Three hours lecture. Study of the processes employed in the manufacture of pulp and paper. Prerequisites or parallel courses: Chemistry 3 and 4, I and II. Mr. Libby.

2. TECHNOLOGY LABORATORY. 2. P. and P. Junior required. Six hours laboratory. Laboratory demonstrations of the principles of pulp and paper manufacture described in Course I. Prerequisite or parallel courses Pulp and Paper 1 and 3. I and II. Mr. Weston.

3. MACHINERY. 3. P. and P. Junior required. Three hours lecture. Lectures on the design, construction and operation of machinery used in the pulp and paper industry. Prerequisite or parallel courses Physics 1 and P. and P. 1. I and II. Mr. Weston.

4. MILL ANALYSIS. 2. P. and P. Junior required. Six hours laboratory. Evaluation of materials used in the manufacture of pulp and paper. Prerequisite or parallel courses: Chemistry 3 and 4 and P. and P.—I. Mr. Libby.

5. PAPER TESTING. 2. P. and P. Junior required. Six hours laboratory. Physical, chemical and microscopical characteristics of papers. Prerequisites or parallel courses P. and P. 4.—II. Mr. Libby.

6. PULP TESTING. 1. P. and P. Senior required. Three hours laboratory. The testing of pulps for freeness, strength, bleach, consumption, etc. Prerequisites or parallel courses: P. and P. 2 and 4.—I. Mr. Libby.

7. COLORING. 2. P. and P. Senior required. Three hours laboratory. Evaluation and identification of dyestuffs and the development of color formulas for dyeing pulp and paper. Prerequisites or parallel courses: P. and P. 4.—II. Mr. Libby.

8. ORGANIZATION. 2. P. and P. Senior required. Two hours lectures and discussion. Methods of organization and administration in typical pulp and paper mills. Prerequisites or parallel courses: P. and P. 1 and 3.—II. Messrs. Libby and Weston.

9. PROBLEM. 2. P. and P. Senior required. A report covering a systematic survey of all available literature on some minor problem of interest to the pulp and paper industry. Prerequisites or parallel courses: Pulp and Paper Mfg. 3 and 4. Forest Chem. 2 and 3 and Chm. 3 and 4.—I. Messrs. Wise, Libby and Weston.

10. PROBLEM. 4. P. and P. Senior required. Laboratory development of the problem formulated in course 9. Prerequisite Pulp and Paper Mfg. 9.—II. Messrs. Wise, Libby and Weston.

## DEPARTMENT OF ECONOMICS

PROFESSOR CRAFER

1. THE ELEMENTARY PRINCIPLES OF ECONOMICS IN THEIR RELATION TO FORESTRY. 4. Four hours lecture. This course will present those elementary principles of economic science which are essential as an introduction to a more specialized course in forest economics. Lectures, recitations, readings and reports.—II. Mr. Crafer.

5. BUSINESS LAW. 3. Three hours lecture. A general survey of subjects more closely connected with the ordinary transaction of business.—II. Mr. Skerritt.

*Additional Courses in strictly Forestry phases of economics are given by members of the College of Forestry Faculty.*

## FOREST ECONOMICS GROUP

1. ELEMENTARY FORESTRY. 2. Two hours lecture. A synoptical course covering the general principles of forestry and its relation to the broad subject of conservation. This course is an introduction to the professional courses in forestry and touches briefly on the more important subjects covered later in silviculture, management, lumbering, utilization and technology.—I. Mr. Fenska.

2. HISTORY OF FORESTRY. 3. Junior required. Three hours lecture. The development of forestry as influenced by the great epochs in world history with especial reference to Germany, France and the United States. Lectures, recitations and reports.—II. Mr. Lee.

3. FOREST LAWS AND POLICIES. 2. Required of Seniors. Two hours lecture. The object of this course is to gain knowledge of the important laws affecting the National Forests and Public Domain. The forest laws of the principle states engaged in forestry work will be studied in detail. Forest taxation, legislation, administration and state and national policies will be discussed.—II. Mr. Hoyle.

4. NATIONAL FOREST PRACTICE. 2. Elective. Two hours lecture. Course covering the creation and organization of United States Forest Service; its policies and activities in the protection, administration and development of the National Forests. Mr. Peirce.

5. FOREST SEMINAR. 2. Required. Assignment and discussion of current forestry subjects.—II. Mr. Fenska.

## DEPARTMENT OF RECREATIONAL FORESTRY

PROFESSOR FRANCIS

1. RECREATIONAL USES OF FOREST AREAS. 3. Elective. Two hours lecture. Three hours in field or on assignments. A general course to teach the fundamental principles of the public use of forest areas for recreation and the relation of recreation to other forest uses.—I and II.

2. DEVELOPMENT OF FOREST PARK RECREATIONAL AREAS. 3. Elective. Open to Juniors and Seniors. One hour lecture. Six hours laboratory. This course takes up the elements of structural design.—I and II.

3. PROJECTS IN FORESTRY RECREATION. 3. Elective. for Seniors. One hour lecture. Six hours laboratory. A course taking up a study of some of the common problems in forest recreation and their logical solution.—I. Prerequisite: Forest Recreation 2.

4. NATIONAL PARK PRACTICE. 2. Elective. Two hours lecture. A brief history of the laws, practices and policies of the State and National Parks.—II.

5. RESEARCH PROBLEMS IN FOREST RECREATION. Graduate elective. Hours to be arranged.—I and II.

## DEPARTMENT OF ENGLISH

ASSISTANT PROFESSOR KNICKERBOCKER, ASSISTANT HEBBLETHWAITE

*Course 1 is required of all Freshmen.*

*Course 2 is required of all Sophomores.*

1. ENGLISH. 3. Required Freshman. The principles of expository writing; the sentence; review; punctuation and spelling; the expository paragraph; organization; word study; accuracy; condensation; letter-writing; elements of technical forestry description; long and short themes; class themes. A brief survey of modern English literature is made during the course of the year.—I and II. Mr. Knickerbocker and Mr. Hebblethwaite.

2. ENGLISH. 3. Required Sophomore. The course is divided into two parts: 1. Advanced problems in scientific forestry and professional writing are studied; and 2, a lecture course in the ideals of life in American literature from Franklin to Howells is supplemented by outside reading, class discussion, and quizzes.—I and II. Mr. Knickerbocker.

### COURSES FOR STUDENTS IN THE COLLEGE OF FORESTRY GIVEN BY ACCESSORY INSTRUCTORS

These courses are given by Departments in the College of Liberal Arts, Applied Science and Fine Arts of the University.

#### RHETORIC

4. PUBLIC ADDRESS. 2. Lectures, classroom declamations. Addresses for all occasions are written and delivered. Parliamentary drill. Extemporaneous speaking and criticism.—I. Mr. Kennedy.

5. ADVANCED PUBLIC ADDRESS. 2. Original orations. Platform etiquette.—II. Mr. Kennedy.

#### GERMAN

1. ELEMENTARY COURSE. 3. Grammer. Translation from German into English, and elementary exercises in translating into German. Special emphasis on oral work. Mr. Copeland.

3. GRAMMER AND READING. 3. Oral work and composition.—Mr. Kullmer.

5. SCIENTIFIC GERMAN. 3. Intended to furnish drill in the reading of modern scientific German and is recommended to students pursuing courses in the natural sciences.—II. Mr. Kullmer.

#### FRENCH

1. ELEMENTARY COURSE. 3. Grammer and reading course. Translation from French into English, and elementary exercises in translating into French. Special emphasis is placed on oral work. Mr.—



2. SCIENTIFIC FRENCH. 3. A reading course designed to meet the needs of students pursuing courses in the natural sciences.—I.

### *SPANISH*

1. ELEMENTARY COURSE. 3. Grammar and reading. Translations from Spanish into English and elementary exercises in translating into Spanish. A course designed to meet the needs of forestry students who contemplate service in Central and South America. Mr. Alemany.

2. SCIENTIFIC SPANISH. 3. A reading course designed as a sequel to the elementary course in Spanish. Selected reading from modern scientific text.—I.

### *HISTORY*

1. EUROPEAN HISTORY. 2. Recent European History dealing especially with international relations and problems arising from the war. America's position as a world power.—II.

### *MATHEMATICS*

1. TRIGONOMETRY. 3. The solution of triangles with and without logarithms, including the derivation of the necessary formulae; the study of trigonometric functions as functions; the derivation and application of formulae involving the functions of one or more angles; the transformation of expression involving the functions; the solution of trigonometric equations.—I. Messrs. Bryant, and Borgwardt, Mrs. Harwood.

### *BOTANY*

1. RANGE AND GRAZING. 2. Elective. Two hours. Lectures, assigned reading and conference upon range and grazing problems.—II. Mr. Bray. Prerequisites: Forest Botany 1 and 2.

### *GEOLOGY*

1. GENERAL GEOLOGY. 3. Two hours lecture. Three hours laboratory. Lectures, recitations, laboratory and field work.—I. Mr. Eaton.

2. GEOLOGY OF SOILS. 3. Two hours lecture. Two hours laboratory. Geology of Soils. Water and Fertilizers.—II. Mr. Eaton.

4. FOREST PHYSIOGRAPHY. 3. Two hours lecture. Two hours laboratory.—II. Mr. Hopkins.

### *PHYSICS*

22. GENERAL PHYSICS. 3. Two hours lecture. Two hours laboratory. Lectures, recitations and laboratory work on mechanics and heat. Mr. Porter.



## THE ROOSEVELT WILD LIFE FOREST EXPERIMENT STATION

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FRANKLIN MOON, M.F., *Dean*

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Richard A. Muttikowski, Ph.D.  
Gilbert M. Smith, Ph.D.  
Edmund Heller, A.B.  
Milton P. Skinner, B.S.

In May, 1919, the Legislature of New York passed a Bill instructing the Trustees of The New York State College of Forestry, to establish The Roosevelt Wild Life Forest Experiment Station. This station

was created as a memorial to Theodore Roosevelt for his services for wild life forestry. The duties of the Station are, as defined by the New York law, as follows:

"To establish and conduct an experimental station to be known as 'Roosevelt Wild Life Forest Experiment station' in which there shall be maintained records of the results of the experiments and investigations made and research work accomplished; also a library of works, publications, papers and data having to do with wild life together with means for practical illustration and demonstration, which library shall, at all reasonable hours, be open to the public."

Furthermore, the duties of the station are to make "investigations, experiments and research in relation to the habits, life histories, methods of propagation and management of fish, birds, game, and food and fur-bearing animals and forest wild life."

The Station continues the State survey of the wild life of forest lands and waters which the College has been conducting since 1912. Investigations have been made of the fish and fish food of Oneida Lake, the relation of birds to the Adirondack forests, the relation of forest wild life to park visitors in the Palisades Interstate Park, the Alleghany State Park, and through gifts of funds and coöperation in the Yellowstone National Park. The Adirondack beaver and the muskrat in relation to the fur industry have also been studied. The results of recent investigations have been published in the *Roosevelt Wild Life Bulletin* of which Volume 2 is now being printed. The editions are limited and not for general free distribution. Application for these Station publications should be made to the Director.

CIRCULAR NO. 45

OF

The New York State  
College of Forestry

AT

SYRACUSE UNIVERSITY

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*Announcement of Courses*

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Published by the University

# THE UNIVERSITY CALENDAR

(All periods are inclusive of the dates given)

## 1926

- Feb. 11.....*Thursday*—Day of Prayer for colleges.  
April 3.....*Saturday*—Middle of Second Semester.  
April 1-7.....*Thursday-Wednesday*—Easter Vacation.  
May 1.....*Saturday*—Moving-Up Day.  
May 15.....*Saturday*—Women's Day.  
May 26-June 5....*Wednesday-Saturday*—Final Examinations.  
June 11.....*Friday*—Annual Meeting of Trustees at 9 A. M.  
June 12.....*Saturday*—Annual Meeting of Alumni Association,  
11 A. M.  
June 13.....*Sunday*—Baccalaureate Sermon, Gymnasium,  
10:30 A.M.  
June 14.....*Monday*—Commencement, 10 A. M.  
June 28-Aug. 6....*Monday-Friday*—Summer Session, first term.  
Aug. 9-Sept. 11...*Monday-Saturday*—Summer Session, second term.  
Sept. 6-Sept. 17...*Monday-Friday*—Summer Surveying Camp.  
Sept. 6-Sept. 8....*Monday-Wednesday*—Entrance Examinations.  
Sept. 9.....*Thursday*—Health Examinations.  
Sept. 13-Sept. 14...*Monday-Tuesday*—Registration for Freshmen.  
Sept. 13-Sept. 14...*Monday-Tuesday*—Supplementary Examinations.  
Sept. 15.....*Wednesday*—Psychological tests.  
Sept. 15-Sept. 16...*Wednesday-Thursday*—Registration for Sophomores,  
Juniors, and Seniors.  
Sept. 16.....*Thursday*—Minimum Essentials Test.  
Sept. 17.....*Friday*—Classes begin in all colleges.  
Nov. 9.....*Tuesday*—Meeting of Trustees at 9 A. M.  
Nov. 13.....*Saturday*—Middle of First Semester.  
Nov. 24-Nov. 27...*Wednesday-Saturday*—Thanksgiving Vacation.  
Dec. 22-Jan. 4....*Wednesday-Tuesday*—Christmas Vacation.

## 1927

- Jan. 29.....*Saturday*—First Semester ends.  
Jan. 31-Feb. 2....*Monday-Wednesday*—Senior Week, Entrance Exam-  
inations, Registration for Second Semester.  
Feb. 3.....*Thursday*—Classes begin in all colleges.  
Feb. 10.....*Thursday*—Day of Prayer for colleges.  
April 2.....*Saturday*—Middle of Second Semester.  
April 14-20.....*Thursday-Wednesday*—Easter Vacation.  
June 10.....*Friday*—Annual Meeting of Trustees, 9 A. M.  
June 11.....*Saturday*—Annual Meeting of Alumni Association,  
11 A. M.  
June 12.....*Sunday*—Baccalaureate Sermon, Gymnasium,  
10:30 A. M.  
June 13.....*Monday*—Commencement, 10 A. M.

# TRUSTEES OF NEW YORK STATE COLLEGE OF FORESTRY

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WILLIAM PRATT GRAHAM, PH.D.

*Vice-Chancellor of the University*

FRANKLIN MOON, A.B., 1901 (Amherst), M.F., 1909 (Yale)

*Dean of the College; Professor of Silviculture*

MAULSBY WILLETT BLACKMAN, A.B., 1901, A.M., 1902 (Kansas), PH.D., 1905 (Harvard)

*Professor of Forest Entomology*

NELSON COURTLANDT BROWN, B.A., 1906, M.F., 1908 (Yale)

*Professor of Forest Utilization*

LEIGH H. PENNINGTON, A.B., 1907, PH.D., 1909 (Michigan)

*Professor of Forest Botany*

JOHN WALLACE STEPHEN, B.A., 1907, M.F., 1909 (Michigan),

M.PED. 1915 (Mich. State College)

*Professor of Silviculture*

CHARLES CHRISTOPHER ADAMS, B.S., 1895 (Illinois Wesleyan),  
M.S., 1898 (Harvard), PH.D., 1908 (Chicago), Sc.D., 1920 (Illinois Wesleyan)

*Professor of Forest Zoölogy; Director of the Roosevelt Wild Life Forest Experiment Station*

HARRY P. BROWN, A.B., 1909, A.M., 1910, PH.D., 1914 (Cornell)

*Professor of Wood Technology*

LAURIE D. COX, A.B., 1903, (Acadia College), S.B. in Landscape Architecture, 1908 (Harvard)

*Professor of Landscape Engineering*

HENRY R. FRANCIS, B.S., 1910 (Massachusetts Agricultural College)

*Professor of Forest Recreation*

LOUIS E. WISE, A.B., 1907, PH.D., 1911 (Columbia)

*Professor of Forest Chemistry*

REUBEN PARKER PRITCHARD, B.S., 1907 (Dartmouth), M.F., 1909 (Yale)

*Professor of Silviculture*



CLARENCE EARL LIBBY, B.S. IN CHEMICAL ENGINEERING, 1916  
(Maine)

*Professor of Pulp and Paper Manufacture*

JAMES F. DUBUAR, A.B., 1914, M.F., 1915 (Michigan)

*Director and Professor of Forestry, New York State Ranger School*

GURTH A. WHIPPLE

*Professor of Forest Extension*

GUSTAV H. LENTZ, Ph.B., 1915, M.F., 1910 (Yale)

*Professor of Forest Extension and Director of Forestry Summer Camp*

RICHARD R. FENSKA, B.S., 1911 (Beloit), M.F., 1913 (Yale)

*Professor of Forest Engineering*

WILLIAM C. KENDALL, A.B., A.M., 1885 (Bowdoin), M.D., 1896  
(Georgetown)

*Ichthyologist, Roosevelt Wild Life Forest Experiment Station*

CARLYN CHASE DELEVAN, A.B., 1914, M.S.F., 1915 (Michigan)

*Professor of Forestry at State Ranger School*

CHARLES E. JOHNSON, A.B., 1906, A.M., 1907, Ph.D., 1912, (Minnesota)

*Professor of Forest Zoölogy*

PAUL D. KELLETER, A.B., 1902 (Washington Univ.), M.F., 1904  
(Yale)

*Director of Forest Extension*

WILLIAM GOULD VINAL, S.B., 1906, A.M., 1907 (Harvard), Ph.D.  
1922 (Brown)

*Professor of Forest Extension*

HIRAM LEROY HENDERSON, A.B., 1915 (Michigan)

*Assistant Professor of Forest Utilization*

CARL CHESWELL FORSAITH, A.B., 1913 (Dartmouth), A.M., 1914,  
Ph.D., 1917 (Harvard)

*Assistant Professor of Wood Technology*

HAROLD CAHILL BELYEA, B.A., 1908, M.A., 1911 (Mount Allison),  
B.Sc.F., 1911 (New Brunswick), M.F., 1916 (Yale)

*Assistant Professor of Forest Engineering*

ALAN F. ARNOLD (Landscape Architecture, Harvard, 1904-08)

*Assistant Professor of Landscape Extension*

ALVIN GOODNOW WHITNEY, A.B., 1907 (Dartmouth), 1908-10  
(Yale Forest School)

*Assistant Director, Roosevelt Wild Life Forest Experiment Station.*

WILLIAM S. KNICKERBOCKER, A.B., 1917, A.M., 1918, P.H.D., 1925 (Columbia)

*Assistant Professor of English; Registrar*

DON M. BENEDICT, B.S., 1917 (Michigan)

*Assistant Professor of Forest Botany*

EDWIN ADOLPHUS HARTLEY, B.S., 1918 (Oregon Agricultural College), M.S. 1921 (Ohio State)

*Assistant Professor of Forest Entomology*

HARRY E. WESTON, B.S., 1920 (New York State College of Forestry)

*Assistant Professor of Pulp and Paper Manufacture*

RAYMOND J. HOYLE, B.S., 1917 (New York State College of Forestry)

*Assistant Professor of Forest Utilization*

ROSS ARTHUR WILLIAMS, B.S.F., 1921 (Montana), M.F., 1923 (Yale)

*Assistant Professor of Forestry at the State Ranger School*

REUBEN W. SMITH, B.S., 1921 (University of California)

*Assistant Professor of Timber Preservation*

I. LAURENCE LEE, B.S., 1915, M.F., 1919 (Yale)

*Instructor in Forest Extension*

RAY E. HIRT, B.S., 1917, M.S., (Syracuse), (Hamline College)

*Instructor in Forest Botany*

WILFORD A. DENCE, B.S., 1919 (New York State College of Forestry)

*Assistant, Roosevelt Wild Life Forest Experiment Station*

JOHN ELTON LODEWICK, B.S., 1919, M.S., 1920 (New York State College of Forestry)

*Instructor in Wood Technology*

ALBERT VAN SICLEN PULLING, B.S., 1915 (New York State College of Forestry)

*Instructor in Forest Zoölogy*

CHARLES G. GELTZ, B.S., 1924 (Penn. State Forest School)

*Commercial Instructor, New York State Ranger School*

WILLIAM MAUGHAN, B.S., 1925 (Minnesota)

*Instructor in Forest Engineering*

LESTER E. PARTELOW

*Draftsman*

LOUIS W. REES, B.S., 1923 (New York State College of Forestry)

*Assistant in Wood Technology*

E. J. ELIASON, B.S., 1923 (Purdue), M.S., 1915 (New York State College of Forestry)

*Assistant in Forest Botany*

W. CLEMENT PERCIVAL, B.S., 1923 (New York State College of Forestry)

*Assistant in Botany*

JAMES A. BEAL, B.S., 1923 (Mass. Agricultural), M.S., 1925 (New York State College of Forestry)

*Assistant in Forest Entomology*

AUBREY H. MACANDREWS, B.S., 1925 (New York State College of Forestry)

*Assistant in Forest Entomology*

EDWIN C. JAHN, B.S., 1925 (New York State College of Forestry)

*Assistant in Forest Chemistry*

WILLIAM M. HARLOW, B.S., 1925 (New York State College of Forestry)

*Assistant in Wood Technology*

WILBERT J. LINCOLN, B.S., 1925 (New York State College of Forestry)

*Assistant in Utilization*

WILLIAM HAMMERLE, B.S., 1925 (New York State College of Forestry)

*Assistant in Silviculture*

RUBY W. HOWE

*Secretary to the Dean*

WALTER W. CHIPMAN, B.S., 1893, A.M., 1904 (Wabash)

*Treasurer*

JAMES H. PINKSTONE

*Cashier*

ELEANOR CHURCH, B.L.E., 1916 (Syracuse)

*Librarian*

CECILE CONVERS, B.L.E., 1922 (Syracuse)

*Reference Librarian*

# THE NEW YORK STATE COLLEGE OF FORESTRY

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The act which created The New York State College of Forestry at Syracuse University in 1911 obligates the College to carry on two important and co-ordinate lines of work; first it is to undertake such special research and state-wide investigation in Forestry as will throw light upon and help in the solution of Forest problems which are now confronting the State and the people of New York; second it is the Institution for educational work in Forestry in the State.

## Investigation and Demonstration

In meeting the first obligation of the College of Forestry, that is the carrying on the research and state-wide investigation in Forestry, two small adjacent farms south of the city were purchased in the spring of 1912 and these have been consolidated and designated as The State Forest Experiment Station. Experimental work was begun at this Station in the spring of 1912 and there are growing at present a large number of tree seedlings and transplants as experimental plantings.

The gift of 1800 acres of land in the Adirondacks to the University for Forestry purpose adds greatly to the facilities of the College for the carrying on of very definite lines of experimental and demonstrational work. In 1913 the College purchased 1016 acres of cut-over land in Cattaraugus County and 113 acres in Madison County. These two Forest Stations are located directly adjacent to important lines of railways and have very great value for demonstrational and experimental purposes. Manifestly such facilities as these various pieces of land offer will be of great value in the work of instruction.

## Plan and Scope of Instruction

Instruction in the field of Forestry proper comprises the following:

1. Lectures and field instruction in historical and economical aspects of Forestry for all students of the University desiring a knowledge of the meaning of Forestry.
2. More extended instruction along these lines to those who desire to prepare themselves to give instruction in Forestry in the Public Schools.
3. Instruction and advice by means of lectures throughout the State before High Schools and Granges and other organizations interested in

any way in the Conservation of our natural resources; the publication of Bulletins and the giving of expert advice on the ground for the benefit of owners of hill lands, of farm woodlots and of timber lands to enable owners to handle these lands so as to make them much more productive than at the present time.

4. Special service to both producers and consumers of forest products such as special market investigations and studies of closer utilization of waste material as may bring producer and consumer together. Co-operative marketing of farm woodlots and development of markets for such by-products of the forest as Christmas trees, burned timber and thinning from sprout growth, already begun by the College.

5. Training of young men in such practical lines of Forestry work as will fit them to fill subordinate positions in the State and National Service. To do this work effectively, a State Ranger School is in operation on the College forest at Wanakena, N. Y. In this School men are trained to fill such positions as Guards, Rangers, Forest Estate Managers, Tree Planting Experts and Nursery Foremen. The year of practical work in the State Ranger School does not necessarily lead to the profession of Forestry.

6. The training of professional Foresters for positions of large responsibility in the State and National Service, or as Forest Experts for private Forest work of any kind.

7. The giving of special technical training to advanced students in Forestry, in Lumbering, Paper and Pulp making, and other phases of Forest Utilization, in Forest Management, in Dendrological Chemistry, in Forest Entomology, Forest Pathology, Forest Zoölogy, etc.

8. Realizing that the continued advancement of Forestry must rest upon a firmer scientific basis, the College believes that one of its most important functions will consist in the proper training of men so that they will be competent to carry on independent investigations in the various phases of scientific Forestry and in the allied sciences. Leaders of forest research must necessarily have taken graduate work in Forestry in its various aspects.

### **Facilities for Instruction**

In 1913 the State of New York appropriated \$250,000 for a Forestry Building on the Campus of Syracuse University. This was completed during the college year of 1916-1917 and occupied by the College during the second semester. This building is one of the best and most effectively equipped Forestry Buildings in the United States.

The College is unusually well equipped with apparatus for laboratory work in Forest Botany, Pathology, Dendrology, Wood Technology, Zoöl-

ogy, Entomology and Pulp and Paper manufacturing, and with instruments for field work in Forest Mensuration and Surveying.

The College has a Forest Library in charge of a graduate librarian and it is being made as complete as possible in literature covering all phases of Forestry and the sciences having a bearing upon Forestry. This library, in connection with the State Forest Experiment Station located south of the city,\* and the excellent facilities for advanced work offered in the several scientific laboratories of the College should appeal strongly to research students.

### **Forest Nursery Practice**

The State Forest Experiment Station just south of the city offers unusual advantages for instructional work in forest nursery practice and other phases of silviculture.

Besides the Experimental Nursery, the Station has a woodlot of thirty acres which is used for demonstration purposes in the marking of trees for thinning and for underplanting.

### **Facilities for General Field Work in Forestry**

Early in the spring of 1912, 1850 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks was given to the University for Forestry purposes by the Rich Lumber Company of Wana-kena, N. Y. This land is very typical of cut over areas in Northern New York and is splendidly adapted for general Forestry work both for the students of the State Ranger School and for the professional Forestry students. In September, 1912, the State Ranger School was opened on this tract with 16 students and two instructors. The tract is being studied carefully and during 1913 a permanent working plan was made which will be carried out over a long period of time. The School has been designated as a Branch State Weather Station. All of this offers splendid opportunity for the carrying on of research and experimental work.

Besides the gift of the forest land in the Adirondacks, three tracts of land were secured by purchase. The largest of these tracts is a piece of 1016 acres, two hours south of Buffalo in Cattaraugus County and known as the Redhouse Station. The second piece is a tract of 113 acres at Chittenango in Madison County, which was formerly the Experimental Farm of the New York Central Railroad. The third and most important purchase was two small, adjacent farms of a hundred acres just south of Syracuse, lying between South Salina Street and Lafayette Road. This is known as the State Forest Experiment Station and upon it the principal forest nursery of the College is maintained. The Roosevelt Wild Life Forest Experiment Station conducts field surveys and research on the wild



life of the forests. Every Forestry student is expected to carry through during his course some definite forest operation, working out the plan and carrying through each operation himself. This will give him the right practical training as well as confidence in carrying on practical work.

### **The Charles Lathrop Pack Demonstration Forest**

The one-thousand-acre Barber tract on Cranberry Lake in the Adirondacks, which for eight years has been the home of the Sophomore Summer Camp, has been purchased by Mr. Pack, President of the American Tree Association, and given to Syracuse University for the use and benefit of the College of Forestry. This splendid property will be known as the "Charles Lathrop Pack Demonstration Forest."

In addition to giving a permanent home to the Summer Camp where 12 weeks' practical experience in field methods is given each summer from June 1 to August 31, the Pack Forest will serve as a laboratory for working out of certain problems still unsolved by the forester. Adjoining Cranberry Lake, the State owns thousands of acres of State Preserve, so that with the 1850 acres of College Forest managed by the New York State Ranger School, the Pack Demonstration Forest will be most advantageously located and capable of rendering great service in the training of young foresters to attack the many problems which face this rapidly growing profession.

### **ADVANTAGEOUSLY LOCATED**

The location of The New York State College of Forestry at Syracuse is especially favorable to the carrying out of both professional training of students and state-wide educational work. All sections of the Adirondacks are easily accessible by rail. Numerous steam and electric lines radiating in every direction from the city lay the entire region of central and northern New York open to the work of the students. There is no better strategic center with respect to solving the Forestry problems which confront the people of the State.

### **Publications**

From time to time the College publishes bulletins and studies on various forestry subjects and problems. A list of those already published may be obtained by writing for it to the Director of Forest Extension, care of the College. Most of the bulletins so listed will be sent free on request. The publications of the Roosevelt Wild Life Forest Experiment Station are for limited free distribution, or may be purchased. All communications concerning these publications should be addressed to the Director of the Roosevelt Station.

The College also publishes a News Bulletin concerning its work. This, too, will be sent free to those interested. Names for the mailing lists should be sent to the Director of Forest Extension.

### **Communications**

General correspondence concerning the College should be addressed to the Dean of the College of Forestry. Requests for forestry counsel or assistance should also be made to the Dean of the College, or to the professor in charge of the special field in which advice or help is wanted.

Inquiries and correspondence concerning entrance should be addressed to the Registrar of the College of Forestry, Syracuse University.

## GENERAL INFORMATION

### Expenses

All bills *except* for dormitory rooms and board are payable at the Treasurer's office, Forestry Building. Checks should be drawn payable to W. W. Chipman, Treasurer.

#### MATRICULATION

Every student on entering the University is required to pay a matriculation fee of \$5.00, which is not returnable. This fee is not required of students passing from one college to another within the University nor of students transferring from another institution if evidence is submitted that such a fee was paid in the former institution. All students entering upon graduate work pay a matriculation fee of \$5.00.

#### FEES

All fees for instruction and incidentals are payable twice a year, on or before the first day of each semester. The Treasurer's receipt admits to classes.

Students who at the beginning of the College year, and for at least twelve months prior thereto, have been bona fide residents of the State of New York are exempt from payment of tuition; provided, however, that no student shall be allowed to transfer from the College of Forestry to another College in Syracuse University wherein tuition is charged without first paying \$7.00 per hour for the hours for which he may receive credit in the latter College, with the understanding that from the above amount shall be deducted whatever amount has been collected and retained by the College of Forestry for tuition and fees.

Tuition per year (Non-residents)	\$100.00
Matriculation (Paid once)	5.00
Sophomore Summer Camp (Paid once), not including board	25.00
*Library Deposit (Returnable)	5.00

#### PER SEMESTER

General Fee, first semester	\$ 20.00
**General Fee, second semester	10.00
Student Activities	1.75

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\* The Library Deposit will be returned at time of graduation, or on leaving College, if personal notice is given *before* leaving.

\*\* The General Fee for the second semester for students not in attendance the first semester will be \$15.00.

Laboratory Fees (all undergraduates) . . . . .	20.00
Laboratory Fees (graduates) . . . . .	25.00
Paper and Pulp students \$10 per semester in addition to regular fee beginning first semester Sophomore year.	
Diploma Fee (Paid at time of graduation) . . . . .	10.00

### DORMITORIES

For circular of information and diagrams of dormitories address the Treasurer of the University.

An advance deposit of \$10.00 must be paid by each student at the office of the Treasurer of the University in the Administration Building when room is engaged or reserved. This payment will be credited upon the first term's bill and will be refunded in case the student does not become or remain a student in the University, provided the room is given up before September 1st.

All remaining payments for rooms and board are payable quarterly in advance, as follows: (1) At the beginning of the College year, (2) the first day after Thanksgiving recess, (3) at the beginning of the second semester, (4) the first day after the Easter vacation.

### SELF-HELP

\*Students who desire temporary or permanent work should confer with the Director of the Appointment Office.

### THE CHARLES LATHROP PACK PRIZE

The Charles Lathrop Pack Foundation was established in 1923 by Mr. Charles Lathrop Pack, President of the American Tree Association, for the purpose of encouraging on the part of students in educational institutions the desire to arouse public interest in forestry and to propagate forestry education among the people. A prize of \$100 will be presented annually to the student or students of the New York State College of Forestry selected by the judges as most worthy of such recognition.

### THE BOY SCOUT SCHOLARSHIP

Through arrangements made with the National Headquarters of the Boy Scouts of America, the College awards each year a Scholarship equal in value to the amount of one hundred dollars to the Boy Scout in the State of New York who is considered most worthy to be the recipient of this honor. Scouts who desire to become applicants for the Scholarship should communicate with Mr. Lorne Barclay, Director of Education, Boy

Scouts of America, 200 Fifth Avenue, New York; or with Professor William S. Knickerbocker, Registrar of the College. Final award is made on the basis of Scout and school records of the applicant.

### PHYSICAL TRAINING

Robust health is necessary to attain high scholarship in college and to perform successfully the duties of later life. With this end in view considerable stress is laid upon well-regulated physical training. Every undergraduate student in the College of Forestry is required to take systematic exercise, including swimming in the gymnasium, during the first year of the course unless physically unable to engage in it.

A medical examination is given every student when he enters upon gymnasium work and his exercises are adapted to the requirements of his health and to the development of a sound body.

### ATHLETICS

The Athletic interests of the University are in the hands of the Athletic Association. All business is transacted through the Athletic Governing Board, which contains representatives from the faculty, the alumni, the students and interested business men of the city. Through this Association the students support teams in all branches of athletics. The Stadium will accommodate all branches of outdoor athletics with the best possible facilities.

### PHOTOGRAPHIC RECORD

For the purpose of a record of all men who enter the College of Forestry and for historical purposes, the College of Forestry requires a cabinet sized photograph of every man who enters the College either in the courses at Syracuse or in the State Ranger School at Wanakena. The photograph will be required to complete registration.

### REQUIREMENTS FOR ADMISSION

Students entering the regular Course leading to a degree must offer 15 units of preparatory work of High School grade. A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. Two to three hours of laboratory, drawing or shop work count as equivalent to one hour of recitation. No candidate is eligible for admission to the professional courses if deficient in more than 1 count of entrance conditions. The following subjects are required for admission to the State College of Forestry.

English (four years) . . . . .	3 Units
History (Ancient, Medieval, English, American, or Modern) . . . . .	1 "
Mathematics . . . . .	2½ "

(all applicants must have completed courses in elementary algebra and plane geometry; the extra half unit may be made up by offering a half year's credit in Solid Geometry or in Trigonometry).

Language (Greek, Latin, French, German, or Spanish) . . . . .	2 "
Science . . . . .	3 "
Elective . . . . .	3½ "

(Elective units may be offered for extra courses in the subjects listed above; or in Freehand and Mechanical Drawing; Carpenter Shop or Foundry; Economics; Agriculture. Credit cannot be granted for purely commercial subjects like stenography or typewriting, commercial arithmetic, or business writing).

Total . . . . .	15 Units
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The College in maintaining a high standard of work believes that satisfactory College work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of Forestry and that there is no short cut to the profession. The College urges every young man who is considering the study of Forestry to make up his mind to spend all the time necessary for thorough preparation for College work.

Freshmen are accepted only at the beginning of the Fall semester. There is no opportunity to enter at midyear except on advanced standing from some other college.



## **UNDERGRADUATE WORK IN THE COLLEGE OF FORESTRY**

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### **I. The Four Year Course in General Forestry Leading to the Degree of Bachelor of Science**

This is essentially a general college course in which the student studies Forestry as his major subject. He should realize that it must necessarily fall short of the measure of special training necessary for the professional Forestry degree. It is designed for students who desire a somewhat intimate knowledge of various branches of Forestry for the general satisfaction which such knowledge gives, or for the use they can make of it in a practical way; for those who wish to prepare themselves to teach certain aspects of Forestry in the public schools; or for those who after their college course wish to take subordinate positions in lumbering or manufacturing of forest products or subordinate positions in State or National Forest Service. Such students will not be entitled to the designation of Professional Foresters merely upon the completion of the four years' course.

### **II. The Four Year Course in Pulp and Paper Manufacture Leading to the Degree of Bachelor of Science**

This course has been established to fill the increasing demand for technical men in the important field of utilization included by the pulp and paper industry. The curriculum of the first year is identical with the general forestry course giving the student the opportunity of determining his future work at the College. The last three years of the course are largely devoted to chemistry, physics, engineering and the technical phases of pulp and paper manufacture. Upon satisfactory completion of the four year program the student should be qualified to enter the pulp and paper industry as a mill control chemist, a technologist in forest products or an operating mill executive.

### **III. The Four Year Course in Landscape and City Forestry Leading to the Degree of Bachelor of Science**

The object of the course is to train men for certain specialized lines of public service which deal with the growing of trees for their aesthetic value, just as the growing of trees for their commercial value is the problem of technical forestry.

The course is aimed primarily at supplying the constantly increasing demand of cities and towns for men with the expert arboricultural knowledge of the forester and the artistic appreciation of the landscape architect, to care for the trees on their streets, parkways and boulevards and in their parks and reservations. Upon graduation, students should be qualified to act as assistants to city foresters, park superintendents or landscape engineers or to act as construction or planting foremen upon any form of landscape or park work or as draftsmen or designers in Landscape, Park or City Planning Organizations.

The care and control of street and park trees is very closely related to park administration and the College aims to make the training so broad that men are prepared for activity in either field.

#### **IV. The Five Year Professional Course Leading to the Degree of Master of Forestry**

This course is designed to prepare Professional Foresters for higher positions of responsibility in the State Service, the National Forest Service and for the position of expert Forester for private concerns. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man must of necessity build his professional training upon a foundation of general culture. It is the unanimous opinion of the leaders in Forestry education and in the development of Forestry policy in this country, that men who expect to follow the profession of Forestry act unwisely if they try to make a short cut by eliminating the foundation training. The large opportunities awaiting thoroughly trained Foresters fully justify them in devoting the full measure of time advised for preparation. It is advised that every man who takes the four year undergraduate course in the College will go on and complete his fifth year either immediately following the fourth year or after a year or two of practical work.

The fifth year of this five year course is in reality graduate work and subject to the rules governing graduate work in the College of Forestry.

#### **V. Graduate Work**

Graduate work in the College has been planned with the purpose of training two different types of men—first, the man with a more complete, broad, general training in forestry and, second, the specialist, capable of investigating special economic and scientific problems of forestry. The broad, general training is designed to train men as administrators of state, national or private forests or parks. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting at least five

years of study and preparation. For this reason it is strongly urged that students who have shown proper ability in the four year course in the College return and complete a fifth year either immediately following the fourth year or after a year or two of practical work. This five year course leads to the degree of Master of Forestry.

There are a vast number of technical and scientific problems which must be investigated before forestry really comes into its own in this country and such problems can be solved only by the man who has been specially trained in methods of investigation and who is thoroughly conversant with the research in his own field. The College of Forestry is offering graduate work in all phases of scientific forestry such as silviculture, wood technology, forest pathology, forest entomology, forest zoölogy, forest chemistry, etc.

The graduate work is open not only to graduates of forestry courses but under certain restrictions, mentioned in another place, to men whose undergraduate work has been along other scientific lines. Two degrees are open to men taking such work: Master of Science and Doctor of Philosophy, the requirements of which are given at another place.

## **Rules Governing Graduate Work in the College of Forestry**

### **DEGREES OFFERED**

The following degrees will be conferred upon the satisfactory completion of approved schedules of courses and of the other requirements:

Master of Forestry, Master of City Forestry, Master of Science and Doctor of Philosophy.

It should be understood that the time requirements mentioned below are minimum requirements only. The College does not obligate itself to grant degrees, except upon the completion of all the work in a manner satisfactory to its faculty. The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.

### **MAJORS AND MINORS**

At the time of enrolling the candidate for a degree shall submit a schedule consisting of not more than 15 semester hours in each semester. This schedule shall be distributed between a major of nine semester hours and two minors of three semester hours each. If so desired, both the major and one minor may be taken in one department or both minors may be taken in one department. This schedule must receive the approval of the graduate committee and the Dean.

## REQUIREMENTS FOR THE DEGREE OF MASTER OF FORESTRY

For the successful prosecution of the work the ability to read German at sight is necessary.

For candidates who are graduates of approved courses in technical forestry a minimum of one year of residence work is required. For graduates in other courses a minimum of two years' residence work will be necessary.

A thesis or report showing the candidate's ability to complete satisfactorily an investigation upon a topic connected with the candidate's major study must be submitted to the professor in charge not later than May 1st of the year in which the candidate receives his degree. This, if approved by the professor in charge, and if acceptable to the graduate committee is so endorsed and a copy is deposited in the library.

Upon the acceptance of his thesis the candidate will be notified and provided he has satisfactorily passed written examinations in all his courses he will at the same time be instructed when to appear for an oral examination. This examination will be given by the professors under whom the candidate's work has been taken—the Dean or some member of the graduate committee acting as chairman. Any member of the faculty is privileged to be present. This examination will not take place later than June 1st.

## REQUIREMENTS FOR THE DEGREE OF MASTER OF CITY FORESTRY

A reading knowledge of French is desirable.

For students who are graduates of the course in City Forestry in this College or who have had equivalent courses, a minimum of one complete year of residence work of acceptable grade along approved lines is required.

Similar requirements with regard to thesis and oral examinations as for the Master of Forestry degree are in force.

## REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

For the successful completion of the work, the ability to read German at sight is necessary.

For students who are graduates in forestry of this institution or others of a similar grade, a minimum of one year of residence work of an acceptable grade is desired.

Students who are graduates in lines other than forestry may be recommended for their degree on the completion of one year of satisfactory residence work provided he has taken at least one minor in forestry. *The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.*

Similar requirements are made as regards thesis and oral examinations as for the preceding two degrees.

## REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

A candidate must be a graduate of a college of approved standing and his undergraduate standing must have been such as to fit him to pursue advanced work in the subject which he chooses as his major. Before beginning the second year of graduate work the candidate must demonstrate his ability to read scientific German and French at sight.

In case the candidate holds merely the Bachelor's degree a minimum of three years' graduate work is required. One year's residence in graduate work at another college may be substituted with the approval of the Dean and graduate committee.

At the time of enrolling, the candidate must choose the major study and two minor studies subject to the same rules as those governing other graduate work. If the candidate is not a graduate in forestry at least one of these minors during two years of his course must be in forestry.

A thesis demonstrating the results of scientific research upon a topic bearing upon his major subject must be completed and receive the approval of the major professor not later than May 1st of the year in which the degree is granted. This must be satisfactory to the Dean and graduate committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the College library.

The candidate is required to pass two examinations, both oral. The preliminary examination will be upon the subjects covered by his major and minors. The final examination will be upon the candidate's thesis.

## VI. Training in the State Ranger School

The State Ranger School gives a practical course of one year which trains men very thoroughly for such positions as forest guard, forest ranger, forest estate manager, tree planting expert and nursery foreman. The work is largely of a practical nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of vari-



ous methods of logging and lumbering and nursery practice and tree planting. It is to be understood that this practical training is not an education in Forestry and that upon completion of the course a man will not be a trained forester. A certificate is given after completion of a year of satisfactory work in the school and a diploma following a year of satisfactory practice. A special bulletin of the Ranger School will be sent upon request. Address: Director James F. Dubuar, New York State Ranger School, Wanakena, N. Y.

### GROUP ELECTIVE SYSTEM—

In September, 1924, a new system of election known as the *Group Elective System* went into effect. By this system the student will, at the proper place in his course, elect his work in one of the following seven groups.

- I. Silviculture and management.
- II. Forest Entomology and Pathology.
- III. Forest Zoölogy and Recreation.
- IV. Wood Technology and Chemistry.
- V. Utilization.
- VI. Landscape Engineering.
- VII. Pulp and Paper Manufacture.

The students electing the Pulp and Paper course will take the Freshman year as prescribed and start this special work at the beginning of the Sophomore year—taking the program of subjects as prescribed in Group VI.

All other students of the college will complete the Freshman and Sophomore years and the Sophomore Summer Camp. With the beginning of the Junior year they will elect one of the five remaining groups.

Students electing Groups I or II and all students in other groups who have elected the course in Silviculture IV and Engineering XI are required to attend the Senior Camp. This will be in session during the month of May of the Senior year and will be devoted to field work in Silviculture and Management.

### Program of Courses

#### FRESHMAN YEAR

Chemistry I	3 hrs.	Chemistry I	3 hrs.
Botany I	3 "	Botany II	4 "
English I	3 "	English I	3 "
Modern Language	3 "	Modern Language	3 "
Mathematics I	3 "	Zoölogy I	3 "
Forestry I	2 "		
	17 hrs.		16 hrs.



## SOPHOMORE YEAR

Geology I	3 hrs.	Geology II	3 hrs.
Wood Technology I	4 "	Wood Technology I	4 "
Engineering I	3 "	Engineering I	3 "
English II	3 "	Entomology I	3 "
Physics XXII or Botany III	3 "	Botany III or Physics XVII	3 "
Drafting and Lettering	1 "	Drafting and Lettering	1 "
	<hr/> 17 hrs.		<hr/> 17 hrs.

SOPHOMORE SUMMER CAMP ON CRANBERRY LAKE IN THE ADIRONDACKS. JUNE 1 TO AUGUST 31. Required of all students in Forestry. Prerequisites: Wood Technology I., Engineering I., Botany I. and II., Entomology I. Instruction by members of the various departments. No Junior who has not had the prescribed engineering at the summer camp will be permitted to take Engineering III.

## GROUP I.—SILVICULTURE AND MANAGEMENT

FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED

## JUNIOR YEAR

Silviculture II	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Engineering VI (Finance)	3 "
Botany VI or Entomology II	3 "	Utilization IV	3 "
Engineering III	3 "	Free Elective	3 or 6 "
Free Elective or not	3 "		
	<hr/> 15 or 18 hrs.		<hr/> 15 or 18 hrs.

## SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Silviculture V	2 "	Silviculture IV	3 "
Engineering XI (Regulation)	3 "	Forestry Seminar	2 "
Laws and Policies	2 "	Forest History	3 "
3 or 6 hrs. elective from the following group:		Engineering XII (Applied Management)	3 "
Zoölogy II		2 or 3 hours elective from the following group:	
Engineering V		Ranging and Grazing	
Forest Chemistry II		Zoölogy VI or VII (Alternate)	
National Forest Practice		Engineering VII	
German V		Utilization III, V	
Utilization II		Entomology XVI	
Botany VI		Forest Chemistry II	
Entomology II		Silviculture XI	
Silviculture XII	3 or 6 "	Wood Technology XIII	2 or 3 "
Free Elective or not	3 "	Free Elective or not	2 or 3 "
	<hr/> 15 or 18 hrs.		<hr/> 15 or 18 hrs.

GROUP II.—ENTOMOLOGY AND PATHOLOGY  
FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED  
JUNIOR YEAR

Silviculture II	3 hrs.	Silviculture III	3 hrs.
World Technology III	3 "	Economics I	3 "
Utilization I	3 "	Forest History	3 "
Botany VI	3 "	Botany XII or	
Entomology II	3 "	Entomology XI or XII	3 "
Elective or not	0 or 3 "	Elective or not	0 or 3 "
	15 or 18 hrs.		15 or 18 hrs.

SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Silviculture V	2 "	Silviculture IV	3 "
Engineering XI (Regulation)	3 "	Mycology or Entomology XVII	3 "
Entomology XIII or Mycology	3 "	Applied Management	
3 or 5 hrs. elective from the		(Engineering XII)	3 "
following:		3 or 4 hrs. elective from the	
Zoölogy II		following:	
Utilization II, XIV		Entomology XI, XII, XV	
National Forest Practice		Zoölogy IV	
Forest Botany XI		Forest Botany XII	
German V		Botany XIII (L.A.)	3 or 4 "
Ecology (L.A.)		Free Elective or not	0 or 3 "
Forest Botany XIV	3 or 5 "		15 or 18 hrs.
Free Elective or not	0 or 3 "		
	15 or 18 hrs.		

GROUP III.—ZOOLOGY AND RECREATION  
FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED  
JUNIOR YEAR

Silviculture II	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Forest Zoölogy IV, V or	
Botany VI or Entomology II	3 "	Recreation I	3 "
Forest Zoölogy II, VII or		Forest Zoölogy XI or	
Recreation I	3 "	Recreation II	3 "
Free Elective or not	3 "	Free Elective or not	3 "
	15 or 18 hrs.		15 or 18 hrs.

SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Forest Zoölogy VI or VII		Recreation IV	2 "
alternate or Recreation III	3 "	Forest Zoölogy V or II	3 "
Forest Zoölogy III or XI or		8 hrs. electives from the	
Landscape Engineering II	3 "	following:	
7 hrs. electives from the		Silviculture IV	
following:		Zoölogy XI	
Botany VI		Landscape Engineering	
Entomology II, XI, XVII		Engineering VII, XII	
Engineering III, XI		Range and Grazing	
Forest Zoölogy II		Entomology XVI, XVII	
National Forest Practice		History of Forestry	8 "
Forest Zoölogy VI or VII	7 "	Free Elective or not	0 or 3 "
Free Elective or not	0 or 3 "		15 or 18 hrs.
	15 or 18 hrs.		

## GROUP IV.—WOOD TECHNOLOGY AND CHEMISTRY

FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED  
JUNIOR YEAR

Silviculture II	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Organic Chemistry	3 "
Botany VI	3 "	Utilization IV	3 "
Organic Chemistry	3 "	Free Elective or not	3 or 6 "
Free Elective	3 "		
	18 hrs.		15 or 18 hrs.

## SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Utilization XIV (Dry Kiln)	3 "	Wood Technology XIV	1 "
Wood Technology XIII	2 "	(Lab. work in Timber Physics)	
(Timber Physics Lecture)		Forest Chemistry XI	
8 hrs. in electives from:		9 hrs. in electives from:	
Utilization II, III		Utilization I (cont.)	
Quantitative Analysis (L.A.)		V, XI, XII	
Qualitative Analysis (L.A.)		Forest History	
Mathematics II (L.A.)		Qualitative Analysis	
Physics (L.A.)		Quantitative Analysis	
Pulp and Paper Mfg. III		Mathematics III (L.A.)	
Wood Technology XI		Mathematics 104 (L.A.)	
German V		(Diff. Calculus)	
Forest Entomology II		Physics (L.A.)	
Physical Chemistry 110-b		Wood Technology IV	
(L.A.)	8 "	Silviculture IV	
Free Elective	3 "	Physical Chemistry 110-b	
	18 hrs.	(L.A.)	9 "
		Free Elective	3 "
			18 hrs.

## GROUP V.—UTILIZATION

## JUNIOR YEAR

Silviculture II	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Utilization I (continued from	
Botany VI or		last semester)	3 "
Entomology II	3 "	Utilization IV	3 "
Utilization III	3 "	Free elective or not	3 or 6 "
Free Elective or not	3 "		
	15 or 18 hrs.		15 or 18 hrs.

## SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Utilization V (Lumber trip)	1 "	Utilization VII (Advanced Wood	
Utilization XIV (Dry Kiln)	3 "	Preservation)	3 "
9 hrs. from the following:		10 hrs. from the following:	
Utilization II, VI		Utilization XI, XII, XII	
Forest Chemistry II		Forest Chemistry II	
Pulp and Paper Mfg. III		Forest History	
Engineering III		Wood Technology XIV	
Wood Technology XI, XIII		Silviculture IV	
German V		Engineering VI	10 "
Forest Botany VI	9 "	Free Elective or not	3 "
National Forest Practice	2 "		
Free Elective or not	3 "		
	15 or 18 hrs.		15 or 18 hrs.

## GROUP VI.—LANDSCAPE ENGINEERING

FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED

## JUNIOR YEAR

Silviculture II	3 hrs.	Silviculture III	3 hrs.
Botany VI	3 "	Economics I	3 "
Entomology III	3 "	Botany XII	3 "
Arboriculture I	3 "	Arboriculture I	3 "
Landscape Engineering II	4 "	Landscape Engineering II	4 "
Elective	2 "	Entomology IIIa	2 "
	18 hrs.		18 hrs.

## SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Landscape Engineering III	4 "	Silviculture IV	3 "
Landscape Engineering IV	3 "	Landscape Engineering III	4 "
Landscape Engineering V	3 "	Landscape Engineering IV	3 "
Elementary Architecture	3 "	Arboriculture III	3 "
Elective	3 "	Elective	3 "
	18 hrs.		18 hrs.

## GROUP VII.—PULP AND PAPER MANUFACTURE

FRESHMAN YEAR AS PRESCRIBED

## SOPHOMORE YEAR

Chemistry III, Qualitative	3 hrs.	Chemistry III, Qualitative	3 hrs.
Physics I	4 "	Physics I	4 "
English II	3 "	Economics I	3 "
Math. II, Algebra	3 "	Math. III, Analytics	3 "
Mechanical Drawing IV	2 "	Mechanical Drawing V	2 "
Wood Technology I	4 "	Wood Technology I	4 "
	19 hrs.		19 hrs.

## THREE MONTHS SUMMER WORK IN A PULP OR PAPER MILL

## JUNIOR YEAR

Chemistry 104, Quantitative	3 hrs.	Chemistry 104, Quantitative	3 hrs.
Forest Chemistry II, Organic	3 "	Forest Chemistry II, Organic	3 hrs.
Rhetoric XV, Public Speaking	3 "	Math. IV, Calculus	3 "
Pulp and Paper Manufacturing:		Pulp and Paper Manufacturing:	
I—Technology	3 "	I—Technology	3 "
II—Laboratory	2 "	II—Laboratory	2 "
III—Machinery	3 "	III—Machinery	3 "
IV—Mill Analyses	2 "	IV—Paper Testing	2 "
	19 hrs.		19 hrs.

## SENIOR YEAR

Wood Technology III	3 hrs.	Wood Technology V—Fihres	3 hrs.
Business Law I	2 "	Mechanical Laboratory III	2 "
Heat and Power I	3 "	Electrical Machinery VI	3 "
Electrical Machinery V	3 "	Electrical Laboratory VI	2 "
Electrical Laboratory V	2 "	Pulp and Paper Mfg. VIII—	
Pulp and Paper Mfg. IX—		Organization	1 "
Problem	1 "	Pup and Paper Mfg. X—	
Pulp and Paper Mfg.—Coloring	2 "	Problem	5 "
Forest Chemistry XI—Cellulose	3 "		
	19 hrs.		16 hrs.

## Description of Courses in the College of Forestry

Note—A numeral following the title of the course indicates the number of credit hours a week. A credit hour means one recitation (or lecture) hour per week. Three laboratory hours are equivalent to one credit hour. All courses extend through the year unless followed by a Roman numeral, which limits the subject to the semester named.

### Department of Forest Botany

PROFESSOR PENNINGTON ; ASSISTANT PROFESSOR BENEDICT ;

INSTRUCTOR HIRT ; ASSISTANTS PERCIVAL AND ELIASON

*Courses 1, 2, 3, 6 required of undergraduates.*

*Courses 11, 12, 13, 14 elective for graduates or undergraduates.*

*Course 21 for graduates only.*

Students who wish to take special work in Forest Pathology should elect Course 11, the first semester of the junior year.

1. FOREST BOTANY. 3. Required, Freshman. Two hours lecture. Three hours laboratory. An elementary course throughout the first year dealing with structure and functions of plants and the fundamental problems of Botany, together with a general survey of the plant kingdom.—I. Messrs. Pennington, Benedict, Hirt, Percival and Eliason.

2. FOREST BOTANY. 4. Required, Freshmen. A continuation of Forest Botany 1.—II. Messrs. Pennington, Benedict, Hirt, Percival and Eliason.

3. PLANT PHYSIOLOGY. 3. Required, Junior. Lectures, recitations, and laboratory. A course designed to teach the fundamental physiological processes involved in growth of plants.—I or II. Mr. Benedict. Prerequisites: Courses 1 and 2.

6. FOREST PATHOLOGY. 3. Required, Junior. One hour lecture. Six hours laboratory. A course of lectures and laboratory work upon the diseases of plants in general with especial emphasis upon diseases of trees.—I. Messrs. Pennington and Benedict. Prerequisites: Courses 1, 2, and 3.

11. GENERAL MYCOLOGY. 3. Elective. One hour lecture. Four to six hours laboratory. A course in the structure and life histories of fungi.—I. Mr. Benedict. Prerequisites: Courses 1, 2 and 3.

12. ADVANCED FOREST PATHOLOGY. 3. Elective. One hour lecture. Six hours laboratory.—I and II. Mr. Pennington. Prerequisites: Courses 6 and 7.

13. CULTURE METHODS. 3. Elective. Six hours laboratory and conference. A study of technique in the isolation and pure culture of fungi.—II. Mr. Benedict. Prerequisites: Courses 6 and 8.

14. **ADVANCED MYCOLOGY.** 3. Elective. A year course in the classification of fungi.—I and II. Mr. Pennington.

21. **RESEARCH IN FOREST BOTANY AND PATHOLOGY.** Elective for graduates.—I and II. Messrs. Bray and Pennington.

### Department of Forest Chemistry

PROFESSORS WISE AND LIBBY; ASSISTANT PROFESSOR WESTON;  
ASSISTANT JAHN

*Courses in Forest Chemistry 2 and II are required of all students in Groups IV and VII. They are open to properly qualified students in Forestry. All courses in paper and pulp manufacture are required of students entering this field. Forest chemistry 12 and 21 are open only to properly qualified students.*

### Forest Chemistry

1. **GENERAL INORGANIC CHEMISTRY.** Required of all Freshmen. Given in the Department of Chemistry of the College of Liberal Arts.—I and II. Mr. Jordy and Instructors.

2. **ORGANIC CHEMISTRY.** 3. P. and P. Junior required. Two hours lecture and 3 hours laboratory. This is primarily an elementary course in organic chemistry. Prerequisite: Chemistry 1,—I and II. Mr. Wise.

11. **CHEMISTRY OF CELLULOSE.** 3. P. and P. Senior required. Three hours lecture. An elementary course in the chemical and physical properties and the use of cellulose and its derivatives. Prerequisite: Forest Chemistry 2.—I. Mr. Wise.

12. **CHEMISTRY OF CELLULOSE.** 2. Graduate elective. Two hours lecture (or seminar). Lecture will cover researches on the constitution, properties, and uses of cellulose and its derivatives. This is essentially a graduate course. Prerequisites: General Chemistry, Qualitative and Quantitative Analysis, Organic Chemistry, and a reading knowledge of German.—II. Mr. Wise.

13. **SEMINAR.** 1. Elective. One hour weekly. Reports on the recent chemical literature dealing with forest products. Prerequisite: Chemistry 3 or its equivalent.—I and II. Mr. Wise.

21. **RESEARCH IN FOREST CHEMISTRY.** Graduate elective. Hours to be arranged. Problems in forest chemistry and organic chemistry will be assigned to properly qualified graduate students. Prerequisites depend upon the nature of the problem.—I and II. Mr. Wise.



## Pulp and Paper Manufacture

*Special bulletin describing the work of the paper and pulp course should be obtained by writing for it to the Registrar of the College. This course is subject to revision from year to year.*

1. TECHNOLOGY. 3. P. and P. Junior required. Three hours lecture. Study of the processes employed in the manufacture of pulp and paper. Prerequisites or parallel courses: Chemistry 3 and 4.—I and II. Mr. Libby.

2. TECHNOLOGY LABORATORY. 2. P. and P. Junior required. Six hours laboratory. Laboratory demonstrations of the principles of pulp and paper manufacture described in Course 1. Prerequisite or parallel courses Pulp and Paper 1 and 3.—I and II. Mr. Weston.

3. MACHINERY. 3. P. and P. Junior required. Three hours lecture. Lectures on the design, construction and operation of machinery used in the pulp and paper industry. Prerequisite or parallel courses: Physics 1 and P. and P. 1.—I and II. Mr. Weston.

4. MILL ANALYSIS. 2. P. and P. Junior required. Six hours laboratory. Evaluation of materials used in the manufacture of pulp and paper. Prerequisite or parallel courses: Chemistry 3 and 4 and P. and P. 1.—I. Mr. Libby.

5. PAPER TESTING. 2. P. and P. Junior required. Six hours laboratory. Physical chemical and microscopical characteristics of papers. Prerequisites or parallel courses: P. and P. 4.—II. Mr. Libby.

7. COLORING. 2. P. and P. Senior required. Three hours laboratory. Evaluation and identification of dyestuffs and the development of color formulas for dyeing pulp and paper. Prerequisites or parallel courses: P. and P. 4.—I. Mr. Libby.

8. ORGANIZATION. 1. P. and P. Senior required. One hour lecture or discussion. Methods of organization and administration in typical pulp and paper mills. Prerequisites or parallel courses: P. and P. 1 and 3.—II. Mr. Weston.

9. PROBLEM. 1. P. and P. Senior required. A report covering a systematic survey of all available literature on some problem of interest to the pulp and paper industry. Prerequisites or parallel courses: Pulp and Paper Mfg. 3 and 4. Forest Chem. 2 and 3 and Chem. 3 and 4.—I. Messrs. Wise, Libby and Weston.

10. PROBLEM. 5. P. and P. Senior required. Laboratory development of the problem formulated in course 9. Prerequisite: Pulp and Paper Mfg. 9.—II. Messrs. Wise, Libby and Weston.

## Forest Economics Group

1. **ELEMENTARY FORESTRY.** 2. Two hours lecture. A synoptical course covering the general principles of forestry and its relation to the broad subject of conversation. This course is an introduction to the professional courses in forestry and touches briefly on the more important subjects covered later in silviculture, management, lumbering, utilization and technology.—I. Mr. Brown.

2. **HISTORY OF FORESTRY.** 3. Junior required. Three hours lecture. The development of forestry as influenced by the great epochs in world history with especial reference to Germany, France and the United States. Lectures, recitations and reports.—II. Mr. Lee.

3. **FOREST LAWS AND POLICIES.** 2. Required of Seniors in the Silviculture and Management group. Two hours lecture. The object of this course is to gain knowledge of the important laws affecting the National Forests and Public Domain. The forest laws of the principal states engaged in forestry work will be studied in detail. Forest taxation, legislation, administration and state and national policies will be discussed.—II. Mr. Hoyle.

4. **NATIONAL FOREST PRACTICE.** 2. Elective. Two hours lecture. Course covering the creation and organization of United States Forest Service: its policies and activities in the protection, administration and development of the National Forests.—II. Mr. Kelleter.

5. **FOREST SEMINAR.** 2. Required. Assignment and discussion of current forestry subjects.—II. Mr. Fenska.

## Department of Forest Engineering

PROFESSOR FENSKA; ASSISTANT PROFESSOR BELYEA;

INSTRUCTOR MAUGHAN

*Courses 1 and 2 are required of all undergraduates.*

*Summer Camp Engineering is also required.*

*Courses 11 and 12 elective to graduates and undergraduates.*

*Courses 21 and 22 elective to graduates only.*

1. **PLANE SURVEYING.** 3. Required Sophomore. Two hours lecture. Three hours field work. A preliminary course in the use of surveying instruments and field methods. Mapping and office computations.—I and II. Messrs, Fenska and Maughan.

The above course is prerequisite for the Sophomore Summer Camp.

2. **FOREST MENSURATION.** Four weeks at the Sophomore Summer Camp. A study of the measurements of volume of logs, trees and forest; estimat-

ing and mapping of timber, compilation of volume tables and collection of data in a detailed study of a forest area by stem analysis for purpose of predicting future possibilities. Messrs. Fenska, Belyea, Maughan and Assistants.

3. TOPOGRAPHIC SURVEYING. 3. One hour lecture. Six hours field work. Methods of topographic mapping, by aneroid and pacing, transit and stadia, abney level and slope chain, plane table with telescopic alidade and trigonometric leveling.—I. Messrs. Fenska and Maughan.

Prerequisite: Summer Camp Engineering.

5. FOREST INCREMENT. 3. Two hours lecture, one laboratory period. A continuation of Forest Mensuration as applied to the principles of determining increment and yields.—I. Mr. Belyea.

6. FOREST FINANCE. 3. Three hours lecture. The business aspects of forest management and the principles of economics and finance underlying the administration of forest properties.—II. Mr. Belyea.

7. FOREST ENGINEERING. 3. Three hours lecture. The application of engineering principles in the construction of trails, roads, bridges, logging railroads, chutes, flumes, dams, telephone line, fire towers, cabins, etc. for the development and proper utilization of a forest.—II. Mr. Fenska.

11. FOREST REGULATION. 3. Three hours lecture. Organization of forests for management. The normal and empirical forest, rotation and methods of regulating the cut.—I. Mr. Belyea.

12. ENGINEERING. Applied Forest Management. 3 hours. The application of management to specific forests and areas as demonstrated by actual practice in the United States.—II. Mr. Belyea.

21. ADVANCED FOREST MANAGEMENT. Elective for Graduate Students only. Individual study of an assigned problem in Forest Management. Hours to be arranged.—I and II. Mr. Belyea.

22. ENGINEERING. Advanced Forest Regulation. Elective to graduates only. Actual problems in regulation of the cut will be given the student with seminar consultation and outside reading. 3 hours credit.—II. Mr. Belyea.

## **Department of Landscape Engineering**

PROFESSOR COX; ASSISTANT PROFESSOR ARNOLD

### **Arboriculture**

1. PLANT MATERIALS. 3. Elective. Lectures, field trips and preparation of planting plans. This course covers deciduous and evergreen shrubs, vines and perennials.—I and II. Mr. Arnold.

2. PRUNING AND CARE OF TREES. 3. Elective. Two hours lecture. Two hours laboratory.—II. Mr. Cox.

3. SHADE AND ORNAMENTAL TREES. 3. Two hours lecture. Deciduous and evergreen trees used for shade or ornamental purposes—their identification and use.—II. Mr. Arnold. Prerequisite: Arboriculture 1.

4. STREET TREE PLANTING. 2. Elective. One hour lecture. Three hours laboratory. The details of modern City Forestry practice.—II. Mr. Cox.

### Landscape Engineering

1. THE APPRECIATION OF LANDSCAPE ARCHITECTURE. 3. Not open to students of the College of Forestry but to other students of the University. Three hours lecture. The elements and principles of Landscape Design. Lectures and reports.—II. Messrs. Cox and Arnold.

2. LANDSCAPE DESIGN. 4. Six hours drafting, two hours lecture, junior year. Elements and principles of Landscape Engineering.—I and II. Messrs. Cox and Arnold.

3. LANDSCAPE DESIGN. 4. Twelve hours drafting, with occasional lectures, senior year. Elementary designs in Landscape Engineering.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 2.

4. LANDSCAPE ENGINEERING CONSTRUCTION. 3. Elective. Two hours lecture. Three hours drafting. Highway design and construction, grading and drainage plans and details of landscape construction.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 3.

5. CITY PLANNING. 3. Elective. Two hours lecture. One hour reports and assigned reading. The economic, aesthetic and engineering principles of modern City planning.—I. Mr. Cox.

6. DRAFTING AND LETTERING. 1. Two hours laboratory with additional hours drafting. Required for all members of the Sophomore class.—I and II. Mr. Cox.

21. LANDSCAPE ENGINEERING DETAILS. 2. Elective. One hour lecture. Three hours drafting. Design of construction used in Landscape Engineering.—I or II. Messrs. Cox and Arnold. Prerequisite: Landscape Engineering 2 and 3.

22. LANDSCAPE ENGINEERING DETAILS. Elective. Advanced landscape engineering design for fifth year students.—I and II. Messrs. Cox and Arnold.

### Department of English

ASSISTANT PROFESSOR KNICKERBOCKER

*Course 1 is required of all Freshmen.*

*Course 2 is required of all Sophomores.*

1. ENGLISH. 3. Required, Freshman. The principles of expository

writing; the sentence; review; punctuation and spelling; the expository paragraph; organization; word study; accuracy; condensation; letter writing; elements of technical forestry description; long and short themes; class themes. A brief survey of modern English literature is made during the course of the year.—I and II. Mr. Knickerbocker and Assistant.

2. ENGLISH. 3. Required, Sophomore. The course is divided into two parts: 1. Advanced problems in technical and professional writing are studied; and 2. A lecture course in the ideals of life in literature supplemented by outside reading, class discussion, and quizzes.—I. Mr. Knickerbocker.

### Department of Forest Entomology

PROFESSOR BLACKMAN; ASSISTANT PROFESSOR HARTLEY;

INSTRUCTORS BEAL AND MACANDREWS

*Course 1 is required of all undergraduates in Forestry.*

*Courses 2 and 3 are optional for Juniors and Seniors.*

*Courses 11, 12, 13, 14, 15, 16 and 17 may be taken either as special undergraduate work or as minors in the graduate courses.*

*Course 21 can be taken only as major graduate work.*

1. ELEMENTARY ENTOMOLOGY. 3. Required, Sophomore. Two hours recitation. Three hours laboratory. A general course devoted to the study of the morphology, life histories and general classification of insects.—II. Messrs. Blackman, Hartley, Beal and MacAndrews. Forest Zoölogy 1 is prerequisite for this course.

2. FOREST ENTOMOLOGY. 3. Elective. Two hours lecture. Three hours laboratory. Devoted to a study of those insects of economic importance in Forestry.—I. Mr. Blackman, Mr. MacAndrews and Assistants. Course 1 is prerequisite.

3. INSECTS AFFECTING SHADE TREES AND ORNAMENTAL SHRUBS. 5. Elective. First Semester. Two hours lecture. Three hours laboratory. Second Semester 1 hour lecture, 3 hours laboratory. Intended primarily for students specializing in City Forestry.—I and II. Mr. Hartley. Course 1 prerequisite.

11. ADVANCED FOREST ENTOMOLOGY. 3. Elective. One hour conference, six hours laboratory or field. Consisting of laboratory work, field work and library investigation.—I or II. Mr. Blackman. Courses 1 and 2 are prerequisite.

12. INSECT ANATOMY. Elective. A more detailed study of the anatomy of certain insects not studied in previous courses. Messrs. Blackman and Hartley.



13. **INSECT TAXONOMY.** Elective. A more detailed study of the classification of some particular group of insects. Mr. Blackman.

14. **INSECT HISTOLOGY.** Elective. A study of the tissues and microscopic anatomy of insects and the methods used in the preparation of insect material for microscopic study. Mr. Blackman.

15. **PROBLEMS IN FOREST ENTOMOLOGY.** Elective. Individual study of small problems in forest entomology.—I or II. Messrs. Blackman and Hartley.

16. **SEMINAR.** 2 hours. Elective. Library investigation, reports and discussion of forest insects of great economic importance. Two hours conference per week. By appointment.—I or II. Mr. Blackman.

17. **INSECT ECOLOGY.** 3 hours. Elective. Two hours lecture. Three hours laboratory or field. A study of the various interacting environmental or habitat factors which influence the relative abundance and distribution of insects; and the practical application of ecological principles to problems in forest entomology. By appointment.—I or II. Mr. Hartley.

21. **RESEARCH PROBLEMS IN FOREST ENTOMOLOGY.** Elective. For graduate students.—I and II. Mr. Blackman.

## **Department of Recreational Forestry**

PROFESSOR FRANCIS

1. **RECREATIONAL USES OF FOREST AREAS.** 3. Elective. Two hours lecture. Three hours in field or in assignments. A general course to teach the fundamental principles of the public use of forest areas for recreation and the relation of recreation to other forest uses.—I and II.

2. **DEVELOPMENT OF FOREST PARK RECREATIONAL AREAS.** 3. Elective. Open to Juniors and Seniors. One hour lecture. Six hours laboratory. This course takes up the elements of structural design.—I and II.

3. **PROJECTS IN FORESTRY RECREATION.** 3. Elective for Seniors. One hour lecture. Six hours laboratory. A course taking up a study of some of the common problems in forest recreation and their logical solution.—I. Prerequisite: Forest Recreation 2.

4. **NATIONAL PARK PRACTICE.** 2. Elective. Two hours lecture. A brief history of the laws, practices and policies of the State and National Parks.—II.

5. **RESEARCH PROBLEMS IN FOREST RECREATION.** Graduate elective. Hours to be arranged.—I and II.



## Department of Silviculture

PROFESSORS STEPHEN AND PRICHARD

1. SILVICULTURE. FARM FORESTRY. 3. Elective. Three hours lecture. Development and management of the farm woodlot.—I Mr. Prichard.

2. SILVICULTURE. ELEMENTARY SILVICULTURE. 3. Two hours lecture. Three hours laboratory. Effect of environment on tree development, the Forest as a society, the effect of the forest on the site, the effect of the site on the forest, moisture conditions within and without the forest, the effect of forests on temperature, soil, etc.—I. Mr. Prichard.

3. SILVICULTURE. SEEDING AND PLANTING. 3. Two hours lecture. Three hours laboratory. A course dealing with all phases of forest propagation especially by seeding and planting.—II. Mr. Prichard.

4. SILVICULTURE. SILVICULTURAL SYSTEMS. 3. Three hours lecture. Field work in Spring Camp. Methods of reproduction of forests as bearing upon silvicultural systems used in this country and abroad and directions for marking to obtain these results.—I. Mr. Prichard.

5. SILVICULTURE. FOREST PROTECTION. 2. Two hours lecture. Protection of forests from fire, wind, frost, animals, and other destructive agencies.—II. Mr. Prichard.

6. SILVICULTURE. SILVICULTURAL SEMINAR. 2. Elective. Two hours conference and discussion of silvicultural problems. Designed to give the students a thorough review of the literature on silviculture.—II. Messrs. Stephen and Prichard.

11. SILVICULTURE. EXPERIMENT STATION PROBLEMS. 3. Elective. Organization, supervision, opportunities, training, methods and results of silvicultural research. This course is intended to equip a student for carrying on research work in silviculture.—I. Mr. Stephen.

12. SILVICULTURE. REGIONAL STUDIES. 2. Elective. Silvicultural methods applied in the management of the important species in the different forest regions.—I. Messrs. Stephen and Prichard.

21. SILVICULTURE. ADVANCED SILVICULTURAL PRACTICE. 2. Elective. Two hours lecture. Special problems in the practice of silviculture in this country and abroad.—II. Messrs. Stephen and Prichard.

SILVICULTURE. 22. RESEARCH IN SILVICULTURE. Elective.—I and II. Messrs. Stephen and Prichard.

22. SILVICULTURAL RESEARCH. Elective. For graduate students.—I and II. Messrs. Stephen and Prichard.

**Department of Wood Technology**

PROFESSOR H. P. BROWN; ASSISTANT PROFESSOR C. C. FORSAITH;  
INSTRUCTOR J. E. LODEWICK

*Course 1 is required of all undergraduates.*

*Course 3 is required of all undergraduates except those specializing in Landscape Engineering.*

*Courses 2, 4, 5, 6, 11 and 12 are elective for graduates and undergraduates.*

*Course 21 is for graduates only.*

1. ELEMENTARY DENDROLOGY. 3. Required Sophomore. Four hours each semester, 1 hour lecture, 2 hours recitation, and 3 hours laboratory. Studies in the identification and taxonomy of woody plants with special reference to the species native to New York State, and other important forest regions of the United States and abroad. Studies of the silvicultural characteristics and of forest regions are included.—I and II. Mr. Lodewick.

2. ORNAMENTAL WOODY PLANTS. 3. Elective. One hour conference and 6 hours laboratory. The identification and taxonomy of ornamental woody plants. (Prerequisite: Wood Technology I.)—I. Mr. Brown.

3. WOOD TECHNOLOGY. 3. Required Junior. One hour lecture and 6 hours laboratory. A study of the structural features of wood. Identification of woods by gross and microscopic structure. The physical properties of wood of value in identification. (Prerequisite: Wood Technology I.)—I. Mr. Brown.

4. PAPER-MAKING FIBERS. 3. Elective (required of Pulp and Paper Seniors). A morphological and taxonomic study of the fibers used in paper-making. (Prerequisites: Wood Technology I and III.)—II. Mr. Lodewick.

11. ADVANCED HISTORICAL MORPHOLOGY. 3. Elective. Two hours lecture and three hours laboratory. An evolutionary study of prehistoric and modern woody plants. (Prerequisites: Wood Technology I and III.)—II. Mr. Forsaith.

12. THE MICROTECHNIQUE OF WOODY TISSUE. 3. Elective. One hour lecture and 6 hours laboratory. Preparation of wood for sectioning, the technique of staining, the use of the microtome, and the practice of photography in relation to wood technology. (Prerequisites: Wood Technology I and III). Mr. Lodewick.

13. TIMBER PHYSICS. 3. Elective. Two hours lecture and 3 hours laboratory. A study of the physical and mechanical properties of wood in-

cluding descriptive lectures, recitations and strength tests in the laboratory. (Prerequisites: Wood Technology I and III.)—II. Mr. Forsaith.

14. TIMBERS OF THE WORLD. 3. Elective. One hour lecture and 6 hours laboratory and assigned reading. A survey of the more important timbers of the world from the standpoint of structure, physical properties, identification, and uses. (Prerequisites: Wood Technology I and III.)—

II. Mr. Brown.

21. RESEARCH IN DENDROLOGY AND WOOD TECHNOLOGY. Elective for graduates. Hours to be arranged. Messrs. Brown and Forsaith.

### Department of Forest Utilization

PROFESSOR N. C. BROWN; ASSISTANT PROFESSORS HENDERSON

HOYLE AND SMITH

*Course 1 is required of all undergraduates.*

*Courses 2, 3, 4, 5, 6, 11, 12, 13, 14 and 21 are elective to graduates and undergraduates who have prerequisites.*

1. LUMBERING. 3. Three hours lecture. Required of Juniors. History and development of the lumber industry and its relation to forestry. Detailed studies of logging, transportation and milling. Utilization 5 supplements this course and is required of all students taking Utilization.—I. Mr. Brown.

2. PORTABLE MILLING AND WOODLOT LOGGING. 1. Elective, Juniors. The principles and practice of portable mill work and intensive logging and utilization.—I. Mr. Henderson.

3. WOOD PRESERVATION. 3. Two hours lecture and field trips. Elective, Juniors. Wood preservation and methods of treatment. Prerequisites: Wood Technology 1 and 3.—II. Mr. Henderson.

4. FOREST PRODUCTS. 3. Elective, Juniors or Seniors. Three hours lecture. A study of the so-called minor forest products such as veneer, paper pulp, cooperage, maple sugar, wood distillation, etc.—II. Mr. Brown.

5. FIELD LUMBER STUDY. 3. Following the prerequisite course in Utilization 1, a trip of two weeks to a month's duration is taken either individually or in a party to study the methods of logging and lumber manufacture.—I or II. Messrs. Brown, Henderson and Hoyle.

6. REGIONAL STUDIES IN LOGGING AND MILLING. 3. Elective, Seniors. Three hours. A detailed study will be made to supplement elementary course in Lumbering (Utilization).—I. Mr. Hoyle.

11. LUMBER SALESMANSHIP. 2. Two hours lecture. Elective, Seniors

or graduates. Second Semester. The principles underlying salesmanship with particular reference to lumber, and their application in the American lumber industry.—II. Mr. Hoyle.

12. BUSINESS METHODS IN THE LUMBER INDUSTRY. 3. Elective, Seniors. Three hours lecture. A review of particular problems affecting the marketing of lumber.—II. Mr. Brown.

13. AMERICAN LUMBER EXPORT TRADE. 2. Two hours lecture. Elective, Seniors or graduates. Second Semester. A study of export methods, ocean shipping, foreign finance and the present and future markets for American Lumber.—I or II. Mr. Brown.

14. DRY KILN ENGINEERING. 3. Elective, Seniors or Graduates. One hour lecture and six hours laboratory. Consisting of a study of the theoretical and practical application of kiln drying of wood products. Landscape VIII, prerequisite.—I. Mr. Henderson.

21. SPECIAL PROBLEMS IN UTILIZATION. Elective for Seniors and Graduates. Conferences and special library and laboratory research in the lumber industry. Hours to be arranged.—I or II.

### Department of Forest Zoology

PROFESSOR ADAMS; PROFESSOR JOHNSON; INSTRUCTOR PULLING

*Zoölogy 1 is required of all Freshmen.*

*Zoölogy 2, 3, 4, 5, 6, 11 are open to Juniors and Seniors and Graduates.*

*Zoölogy 21 is open only to Graduates.*

These courses are designed as a training in the scientific principles underlying the relation of animals to forest lands and waters, and national and state parks, and the application of these principles to the economic and social problems concerned with birds, fish and game, grazing, fur-bearing, and other forest animals.

1. GENERAL ZOÖLOGY. 3. Required, Freshman. Two hours recitation. Three hours laboratory. A course in general principles of Zoölogy.—II. Mr. Johnson and Mr. Pulling.

2. FISH AND GAME. 3. Elective. One hour lecture. Six hours laboratory or field. A course devoted primarily to a study of the general relations of fish, game, fur-bearing and other forest animals to forestry, emphasizing the administrative, economic and social aspects of the problem.—I. Mr. Adams. Prerequisite: Zoölogy 1 or equivalent and Entomology 1.

3. ECOLOGY OF FRESH WATER ANIMALS. 3. Elective. One hour lecture. Six hours laboratory or field. This course is intended to give a scientific foundation for the application of animal ecology to the aquatic life of the lakes and streams of forest lands and parks. Mr. Adams.

4. ECOLOGY OF FOREST ANIMALS. 3. Elective. One hour lecture. Six hours laboratory or field. This course is complementary to the preceding and is devoted to a training in the scientific foundations and the application of ecology to the land animals of coniferous and hardwood forests and parks. Mr. Adams.

5. NATURAL HISTORY OF NATIONAL PARKS AND PRESERVES. 3. Elective. One hour lecture and six hours in laboratory or field. A study of the theory and practice of the principles underlying the appreciation and care of the natural history resources, mainly animals, of National Parks and State and private wild life preserves. Open to Juniors and Seniors.—II. Mr. Adams.

6. GRAZING AND PREDATORY CONTROL. 3. Elective. Two hours lecture. Three hours laboratory or field. Intended to show the relation of grazing to forest management, including predatory animal and rodent control, particularly in National Forests. Prerequisite: Zoölogy 1.—I. Mr. Johnson.

7. FOREST GAME AND FUR ANIMALS. 3. Covering the natural history, of game and fur-bearing animals. To be given in alternate years with Grazing and Predatory Control. (Zoölogy 6) and to be given in 1925.—I. Mr. Johnson. Prerequisite: Zoölogy 1.

11. PROBLEMS IN FOREST ZOÖLOGY. Elective; hours to be arranged. Individual study of special forest zoölogy problems. Mr. Adams and Mr. Johnson. Prerequisites: Zoölogy 1, and 2 or 7.

21. ECOLOGICAL RESEARCH IN FOREST ZOÖLOGY. Elective. For graduate students.—I and II. Mr. Adams and Mr. Johnson.

### **Courses for Students in the College of Forestry Given by Accessory Instructors**

These courses are given by Departments in the College of Liberal Arts, Applied Science and Fine Arts of the University.

#### **BOTANY**

1. RANGE AND GRAZING. 2. Elective. Two hours. Lectures, assigned reading and conference upon range and grazing problems.—II. Mr. Bray. Prerequisites: Forest Botany 1 and 2.

#### **ECONOMICS**

1. THE ELEMENTARY PRINCIPLES OF ECONOMICS IN THEIR RELATION TO FORESTRY. 4. Three hours lecture. This course will present those elementary principles and economic science which are essential as an in-



roduction to a more specialized course in forest economics. Lectures, recitations, readings and reports.—II. Mr. Crafer.

5. BUSINESS LAW. 3. Three hours lecture. A general survey of subjects more closely connected with the ordinary transaction of business.—II. Mr. Skerritt.

## FRENCH

1. ELEMENTARY COURSE. 3. Grammar and reading course. Translation from French into English, and elementary exercises in translating into French. Special emphasis is placed on oral work. Mr. Brenes-Mesen.

2. SCIENTIFIC FRENCH. 3. A reading course designed to meet the needs of students pursuing courses in the natural sciences.—I.

## GEOLOGY

1. GENERAL GEOLOGY. 3. Two hours lecture. Three hours laboratory. Lectures, recitations, laboratory and field work.—I. Mr. Eaton.

2. GEOLOGY OF SOILS. 3. Two hours lecture. Two hours laboratory. Geology of Soils. Water and Fertilizers.—II. Mr. Eaton.

4. FOREST PHYSIOGRAPHY. 3. Two hours lecture. Two hours laboratory.—II. Mr. Hopkins.

## GERMAN

1. ELEMENTARY COURSE. 3. Grammar. Translation from German into English, and elementary exercises in translating into German. Special emphasis on oral work. Mr. Copeland.

3. GRAMMAR AND READING. 3. Oral work and composition.—Mr. Kullmer.

5. SCIENTIFIC GERMAN. 3. Intended to furnish drill in the reading of modern scientific German and is recommended to students pursuing courses in the natural sciences.—II. Mr. Kullmer.

## HISTORY

1. EUROPEAN HISTORY. 2. Recent European History dealing especially with international relations and problems arising from the war. America's position as a world power.—II.

## MATHEMATICS

1. TRIGONOMETRY. 3. The solution of triangles with and without logarithms, including the derivation of the necessary formulae; the study of trigonometric functions as functions; the derivation and application of



formulae involving the functions of one or more angles; the transformation of expression involving the functions; the solution of trigonometric equations.—I. Messrs. Bryan and Borgwardt and Mrs. Harwood.

### PHYSICS

22. GENERAL PHYSICS. 3. Two hours lecture. Two hours laboratory. Lectures, recitations and laboratory work on mechanics and heat. Mr. Porter.

### RHETORIC

4. PUBLIC ADDRESS. 2. Lectures, classroom declamations. Addresses for all occasions are written and delivered. Parliamentary drill. Extemporaneous speaking and criticism.—I. Mr. Kennedy.

5. ADVANCED PUBLIC ADDRESS. 2. Original orations. Platform etiquette.—II. Mr. Kennedy.

# THE ROOSEVELT WILD LIFE FOREST EXPERIMENT STATION

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FRANKLIN MOON, M.F., *Dean*

## Honorary Advisory Council of the Roosevelt Wild Life Station

### AMERICAN MEMBERS

MRS. CORINNE ROOSEVELT ROBINSON.....	<i>New York City</i>
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Charles Christopher Adams, Ph.D., Sc.D.,	<i>Director</i>
Alvin Goodnow Whitney, A.B.,	<i>Assistant Director</i>
William Converse Kendall, A.M., M.D.,	<i>Ichthyologist</i>
Wilford A. Dence, B.S.,	<i>Assistant Ichthyologist</i>

### COLLABORATORS

Edward R. Warren, B.S.
Richard A. Muttikowski, Ph.D.
Milton P. Skinner, B.S.

In May, 1919, the Legislature of New York passed a Bill instructing the Trustees of The New York State College of Forestry, to establish

The Roosevelt Wild Life Forest Experiment Station. This station was created as a memorial to Theodore Roosevelt for his services for wild life forestry. The duties of the Station are, as defined by the New York law, as follows:

"To establish and conduct an experimental station to be known as 'Roosevelt Wild Life Forest Experiment station' in which there shall be maintained records of the results of the experiments and investigations made and research work accomplished; also a library of works, publications, papers and data having to do with wild life together with means for practical illustrations and demonstration, which library shall, at all reasonable hours, be open to the public."

Furthermore, the duties of the station are to make "investigations, experiments and research in relation to the habits, life histories, methods of propagation and management of fish, birds, game, and food and fur-bearing animals and forest wild life."

The Station continues the State survey of the wild life of forest lands and waters which the College has been conducting since 1912. Investigations have been made of the fish and fish food of Oneida Lake, the relation of birds to the Adirondack forests, the relation of forest wild life to park visitors in the Palisades Interstate Park, the Alleghany State Park, and through gifts of funds and coöperation in the Yellowstone National Park. The Adirondack beaver and the muskrat in relation to the fur industry have also been studied. The results of recent investigations have been published in the *Roosevelt Wild Life Bulletin*, of which Volume 3 is now being printed. The editions are limited and are not for general distribution. Application for these Station publications should be made to the Director.



*Circular No. 47*

OF

**The New York State  
College of Forestry**

AT

**SYRACUSE UNIVERSITY**

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**Announcement of Courses**

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Published by the University

## CALENDAR FOR 1927-1928

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### 1927

- Feb. 10.....*Thursday*—Day of Prayer for Colleges  
Apr. 2.....*Saturday*—Middle of Second Semester  
Apr. 14-Apr. 20.....*Thursday-Wednesday*—Easter Vacation  
June 10.....*Friday*—Annual Meeting of the Trustees, 9 A. M.  
June 11.....*Saturday*—Annual Meeting of Alumni Association  
June 12.....*Sunday*—Baccalaureate Sermon, Gymnasium, 10:30  
A. M.  
June 13.....*Monday*—Commencement, 10 A. M.  
Sept. 5-Sept. 7.....*Monday-Wednesday*—Entrance Examinations  
Nov. 8.....*Tuesday*—Meeting of the Trustees at 9 A. M.  
Nov. 12.....*Saturday*—Middle of the First Semester  
Nov. 23-Nov. 26.....*Wednesday-Saturday*—Thanksgiving Vacation  
Dec. 21-Jan. 3.....*Wednesday-Tuesday*—Christmas Vacation

### 1928

- Feb. 9.....*Thursday*—Day of Prayer for Colleges  
Apr. 1.....*Saturday*—Middle of Second Semester  
Apr. 13-Apr. 19.....*Thursday-Wednesday*—Easter Vacation  
June 9.....*Friday*—Annual Meeting of Trustees, 9 A. M.  
June 10.....*Saturday*—Annual Meeting of Alumni Association  
June 11.....*Sunday*—Baccalaureate Sermon, Gymnasium, 10:30  
A. M.  
June 12.....*Monday*—Commencement 10 A. M.



# TRUSTEES OF THE NEW YORK STATE COLLEGE OF FORESTRY

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## Ex-Officio

DR. CHARLES WESLEY FLINT . . . . .	Syracuse, N. Y.
<i>Chancellor</i>	
DR. FRANK P. GRAVES . . . . .	Albany, N. Y.
<i>Commissioner of Education</i>	
HON. SEYMOUR LOWMAN . . . . .	Albany, N. Y.
<i>Lieutenant Governor</i>	
HON. ALEXANDER McDONALD . . . . .	Albany, N. Y.
<i>Conservation Commissioner</i>	

## Appointed by Governor

HON. LOUIS MARSHALL . . . . .	New York City
HON. ALEXANDER T. BROWN . . . . .	Syracuse, N. Y.
HON. JOHN R. CLANCY . . . . .	Syracuse, N. Y.
HON. HAROLD D. CORNWALL . . . . .	Glenfield, N. Y.
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HON. WILLIAM KELLEY . . . . .	Syracuse, N. Y.
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HON. J. HENRY WALTERS . . . . .	New York City
HON. CHARLES A. UPSON . . . . .	Lockport, N. Y.

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President	Vice-President
LOUIS MARSHALL	JOHN R. CLANCY

## FACULTY OF THE NEW YORK STATE COLLEGE OF FORESTRY

---

CHARLES WESLEY FLINT, M.A., D.D., LL.D., PAED.D.  
*Chancellor of the University*

WILLIAM PRATT GRAHAM, PH.D.  
*Vice-Chancellor of the University*

FRANKLIN MOON, A.B., 1901 (Amherst), M.F., 1909 (Yale)  
*Dean of the College; Professor of Silviculture*

MAULSBY WILLETT BLACKMAN, A.B., 1901, A.M., 1902 (Kansas), PH.D., 1905 (Harvard)  
*Professor of Forest Entomology*

NELSON COURTLANDT BROWN, A.B., 1906, M.F., 1908 (Yale)  
*Professor of Forest Utilization*

LEIGH H. PENNINGTON, A.B., 1907, PH.D., 1909 (Michigan)  
*Professor of Forest Botany*

JOHN WALLACE STEPHEN, A.B., 1907, M.F., 1909 (Michigan),  
M.PED. 1915 (Mich. State College)  
*Professor of Silviculture*

HARRY P. BROWN, A.B., 1909, A.M., 1910, PH.D., 1914 (Cornell)  
*Professor of Wood Technology*

LAURIE D. COX, A.B., 1903, (Acadia College), S.B. in Landscape  
Architecture, 1908 (Harvard)  
*Professor of Landscape Engineering*

HENRY R. FRANCIS, B.S., 1910 (Massachusetts Agricultural College)  
*Professor of Forest Recreation*

LOUIS E. WISE, A.B., 1907, PH.D., 1911 (Columbia)  
*Professor of Forest Chemistry*

REUBEN PARKER PRICHARD, B.S., 1907 (Dartmouth), M.F.,  
1909 (Yale)  
*Professor of Silviculture*

CLARENCE EARL LIBBY, B.S., IN CHEMICAL ENGINEERING, 1916  
(Maine)  
*Professor of Pulp and Paper Manufacture*

JAMES F. DUBUAR, A.B., 1914, M.F., 1915 (Michigan)  
*Director and Professor of Forestry, New York State Ranger School*

GURTH A. WHIPPLE

*Professor of Forest Extension*

GUSTAV H. LENTZ, PH.B., 1915, M.F., 1910 (Yale)

*Professor of Forest Extension and Director of Forestry Summer Camp*

RICHARD R. FENSKA, B.S., 1911, (Beloit), M.F., 1913 (Yale)

*Professor of Forest Engineering*

WILLIAM C. KENDALL, A.B., A.M., 1885 (Bowdoin), M.D., 1896 (Georgetown)

*Ichthyologist, Roosevelt Wild Life Forest Experiment Station*

CARYLN CHASE DELEVAN, A.B., 1914, M.S.F., 1915 (Michigan)

*Professor of Forestry at State Ranger School*

CHARLES E. JOHNSON, A.B., 1906, A.M., 1907, PH.D., 1912, (Minnesota)

*Professor of Forest Zoology; Acting Director of the Roosevelt Wild Life Forest Experiment Station*

PAUL D. KELLETER, A.B., 1902 (Washington Univ.), M.F., 1904 (Yale)

*Director of Forest Extension*

WILLIAM GOULD VINAL, S.B., 1906, A.M., 1907 (Harvard), PH.D. 1922 (Brown)

*Professor of Forest Extension*

WALTER W. CHIPMAN, B.S., 1893, A.M., 1904 (Wabash)

*Treasurer*

HIRAM LEROY HENDERSON, A.B., 1915 (Michigan)

*Assistant Professor of Forest Utilization*

CARL CHESWELL FORSAITH, A.B., 1913 (Dartmouth), A.M., 1914, PH.D., 1917 (Harvard)

*Assistant Professor of Wood Technology*

HAROLD CAHILL BELYEA, B.A., 1908, M.A., 1911 (Mount Allison), B.Sc.F., 1911 (New Brunswick), M.F., 1916 (Yale)

*Assistant Professor of Forest Engineering*

ALAN F. ARNOLD (Landscape Architecture, Harvard, 1904-08)

*Assistant Professor of Landscape Extension*

ALVIN GOODNOW WHITNEY, A.B., 1907 (Dartmouth), 1908-10 (Yale Forest School)

*Professor of Zoology; Assistant Director, Roosevelt Wild Life Forest Experiment Station*

LAURANCE LEE, A.B., 1915, M.F., 1919 (Yale)

*Assistant Professor of English; Registrar*

DON M. BENEDICT, B.S., 1917 (Michigan)

*Assistant Professor of Forest Botany*

\*EDWIN ADOLPHUS HARTLEY, B.S., 1918 (Oregon Agricultural College), M.S., 1921 (Ohio State)

*Assistant Professor of Forest Entomology*

RAYMOND J. HOYLE, B.S., 1917 (New York State College of Forestry)

*Assistant Professor of Forest Utilization*

ROSS ARTHUR WILLIAMS, B.S.F., 1921 (Montana), M.F., 1923 (Yale)

*Assistant Professor of Forestry at the State Ranger School*

RAY E. HIRT, B.S., 1917 (Hamline University), M.S., 1924 (Syracuse),

*Instructor in Forest Botany*

WILFORD A. DENCE, B.S., 1919 (New York State College of Forestry)

*Assistant, Roosevelt Wild Life Forest Experiment Station*

JOHN ELTON LODEWICK, B.S., 1919, M.S., 1920 (New York State College of Forestry)

*Instructor in Wood Technology*

ALBERT VAN SICLEN PULLING, B.S., 1915 (New York State College of Forestry)

*Instructor in Forest Zoölogy*

WILLIAM MAUGHAN, B.S., 1925 (Minnesota)

*Instructor in Forest Engineering*

GEORGE P. KRAMER, B.F., 1921 (Penn State Forest School)

*Instructor in Timber Preservation*

FLOYD C. PETERSON, B.S., 1924, M.S., 1925 (New York State College of Forestry)

*Instructor in Pulp and Paper Manufacture*

LESTER E. PARTELOW

*Draftsman*

LOUIS W. REES, B.S., 1923 (New York State College of Forestry)

*Assistant in Wood Technology*

E. J. ELIASON, B.S., 1923 (Purdue), M.S., 1925 (New York State College of Forestry)

*Assistant in Forest Botany*

W. CLEMENT PERCIVAL, B.S., 1923 (New York State College of Forestry)

*Assistant in Forest Botany*

DONALD DELEON, B.S., 1925 (New York State College of Forestry)

*Assistant in Forest Entomology*

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\*Deceased Oct. 15, 1926

HOWARD W. MORGAN, B.S., 1926 (New York State College of Forestry)  
*Assistant in Forest Chemistry*

WILLIAM M. HARLOW, B.S., 1925, M.S., 1926 (New York State College  
of Forestry)  
*Assistant in Wood Technology*

P. A. HAYWARD, B.S., 1926 (New York State College of Forestry)  
*Assistant in Utilization*

GERALD S. WHEELER, B.S., 1926 (Maine)  
*Assistant in Forest Engineering*

CLAUDE C. BELL, B.S., 1923 (New York State College of Forestry)  
*Assistant in Utilization*

RUBY W. HOWE  
*Secretary to the Dean*

JAMES H. PINKSTONE  
*Cashier*

ELEANOR CHURCH, B.L.E., 1916 (Syracuse)  
*Librarian*

CECILE CONVERS, B.L.E., 1922 (Syracuse)  
*Reference Librarian*

# **THE NEW YORK STATE COLLEGE OF FORESTRY**

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The act which created The New York State College of Forestry at Syracuse University in 1911 obligates the College to carry on two important and co-ordinate lines of work; first it is to undertake such special research and state-wide investigation in forestry as will throw light upon and help in the solution of forest problems which are now confronting the State and the people of New York; second it is the institution for educational work in forestry in the State.

## **Investigation and Demonstration**

In meeting the first obligation of the College of Forestry, that is, the carrying on the research and state-wide investigation in forestry, two small adjacent farms south of the city were purchased in the spring of 1912 and these have been consolidated and designated as The State Forest Experiment Station. Experimental work was begun at this station in the spring of 1912 and there are growing at present a large number of tree seedlings and transplants as experimental plantings.

The gift of 1800 acres of land in the Adirondacks to the University for forestry purpose adds greatly to the facilities of the College for the carrying on of very definite lines of experimental and demonstrational work. In 1913 the College purchased 1016 acres of cut-over land in Cattaraugus County and 113 acres in Madison County. These two Forest Stations are located directly adjacent to important lines of railways and have very great value for demonstrational and experimental purposes. Manifestly such facilities as these various pieces of land offer will be of great value in the work of instruction.

## **Plan and Scope of Instruction**

Instruction in the field of forestry proper comprises the following:

1. Lectures and field instruction in historical and economical aspects of forestry for all students of the University desiring a knowledge of the meaning of forestry.
2. More extended instruction along these lines to those who desire to prepare themselves to give instruction in forestry in the public schools.
3. Instruction and advice by means of lectures throughout the State before high schools and granges and other organizations interested in any way in the conservation of our natural resources; the publication of bulletins and the giving of expert advice on the ground for the benefit of



owners of hill lands, of farm woodlots and of timber lands to enable owners to handle these lands so as to make them much more productive than at the present time.

4. Special service to both producers and consumers of forest products such as special market investigations and studies of closer utilization of waste material as may bring producer and consumer together. Co-operative marketing of farm woodlots and development of markets for such by-products of the forest as Christmas trees, burned timber and thinning from sprout growth, already begun by the College.

5. Training of young men in such practical lines of forestry work as will fit them to fill subordinate positions in the state and national service. To do this work effectively, a State Ranger School is in operation on the College forest at Wanakena, N. Y. In this School men are trained to fill such positions as guards, rangers, forest estate managers, tree planting experts and nursery foremen. The year of practical work in the State Ranger School does not necessarily lead to the profession of forestry.

6. The training of professional foresters for positions of large responsibility in the state and national service, or as forest experts for private forest work of any kind.

7. The giving of special technical training to advanced students in Forestry, in Lumbering, Paper and Pulp making, and other phases of Forest Utilization, in Forest Management, in Dendrological Chemistry, in Forest Entomology, Forest Pathology, Forest Zoölogy, etc.

8. Realizing that the continued advancement of forestry must rest upon a firmer scientific basis, the College believes that one of its most important functions will consist in the proper training of men so that they will be competent to carry on independent investigations in the various phases of scientific forestry and in the allied sciences. Leaders of forest research must necessarily have taken graduate work in forestry in its various aspects.

## Facilities for Instruction

In 1913 the State of New York appropriated \$250,000 for a forestry building on the campus of Syracuse University. This was completed during the college year of 1916-1917 and occupied by the College during the second semester. This building is one of the best and most effectively equipped forestry buildings in the United States.

The College is unusually well equipped with apparatus for laboratory work in forest Botany, Pathology, Dendrology, Wood Technology, Zoölogy, Entomology and Pulp and Paper manufacturing, and with instruments for field work in Forest Mensuration and Surveying.

The College has a forest library in charge of a graduate librarian and it is being made as complete as possible in literature covering all phases

of forestry and the sciences having a bearing upon forestry. This library, in connection with the State Forest Experiment Station located south of the city, and the excellent facilities for advanced work offered in the several scientific laboratories of the College should appeal strongly to research students.

### **Forest Nursery Practice**

The State Forest Experiment Station just south of the city offers unusual advantages for instructional work in forest nursery practice and other phases of silviculture.

Besides the Experimental Nursery, the Station has a woodlot of thirty acres which is used for demonstration purposes in the marking of trees for thinning and for underplanting.

### **Facilities for General Field Work in Forestry**

Early in the spring of 1912, 1850 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks was given to the University for forestry purposes by the Rich Lumber Company of Wana-kenah, N. Y. This land is typical of cut-over areas in Northern New York and is splendidly adapted for general forestry work both for the students of the State Ranger School and for the professional forestry students. In September, 1912, the State Ranger School was opened on this tract with 16 students and two instructors. The tract is being studied carefully and during 1913 a permanent working plan was made which will be carried out over a long period of time. The School has been designated as a Branch State Weather Station. All of this offers splendid opportunity for the carrying on of research and experimental work.

Besides the gift of the forest land in the Adirondacks, three tracts of land were secured by purchase. The largest of these tracts is a piece of 1016 acres, two hours south of Buffalo in Cattaraugus County and known as the Redhouse Station. The second piece is a tract of 113 acres at Chittenango in Madison County, which was formerly the Experimental Farm of the New York Central Railroad. The third and most important purchase was two small, adjacent farms of a hundred acres just south of Syracuse, lying between South Salina Street and Lafayette Road. This is known as the State Forest Experiment Station and upon it the principal forest nursery of the College is maintained. The Roosevelt Wild Life Forest Experiment Station conducts field surveys and research on the wild life of the forests. Every forestry student is expected to carry through during his course some definite forest operation, working out the plan and carrying through each operation himself. This will give him the right practical training as well as confidence in carrying on practical work.

## **The Charles Lathrop Pack Demonstration Forest**

The one-thousand-acre Barber tract on Cranberry Lake in the Adirondacks, which for eight years has been the home of the Sophomore Summer Camp, has been purchased by Mr. Charles Lathrop Pack, President of the American Tree Association, and given to Syracuse University for the use and benefit of the College of Forestry. This splendid property will be known as the "Charles Lathrop Pack Demonstration Forest."

In addition to giving a permanent home to the Summer Camp where 12 weeks' practical experience in field methods is given each summer from June 1 to August 31, the Pack Forest will serve as a laboratory for working out of certain problems still unsolved by the forester. Adjoining Cranberry Lake, the State owns thousands of acres of State Preserve, so that with the 1850 acres of College Forest managed by the New York State Ranger School, the Pack Demonstration Forest will be most advantageously located and capable of rendering great service in the training of young foresters to attack the many problems which face this rapidly growing profession.

## **Location of the College**

The location of The New York State College of Forestry at Syracuse is especially favorable to the carrying out of both professional training of students and state-wide educational work. All sections of the Adirondacks are easily accessible by rail. Numerous steam and electric lines radiating in every direction from the city lay the entire region of central and northern New York open to the work of the students. There is no better strategic center with respect to solving the forestry problems which confront the people of the State.

## **Publications**

From time to time the College publishes bulletins and studies on various forestry subjects and problems. A list of those already published may be obtained by application to the Director of Forest Extension, care of the College. Most of the bulletins so listed will be sent free on request. The publications of the Roosevelt Wild Life Forest Experiment Station are for limited free distribution, or may be purchased. All communications concerning these publications should be addressed to the Director of the Roosevelt Wild Life Station.

The College also publishes a News Bulletin concerning its work. This, too, will be sent free to those interested. Names for the mailing lists should be sent to the Director of Forest Extension.

## Communications

General correspondence concerning the College should be addressed to the Dean of the College of Forestry. Requests for forestry counsel or assistance should also be made to the Dean of the College, or to the professor in charge of the special field in which advice or help is wanted.

Inquiries and correspondence concerning entrance should be addressed to the Registrar of the College of Forestry, Syracuse University.

# GENERAL INFORMATION

## Expenses

All bills *except* for dormitory rooms and board are payable at the Treasurer's office, Forestry Building. Checks should be drawn payable to W. W. Chipman, Treasurer.

### MATRICULATION

Every student on entering the University is required to pay a matriculation fee of \$5.00. This fee is not required of students passing from one college to another within the University nor of students transferring from another institution if evidence is submitted that such a fee was paid in the former institution. All students entering upon graduate work pay a matriculation fee of \$5.00.

### FEES

All fees for instruction and incidentals are payable twice a year, on or before the first day of each semester. The Treasurer's receipt admits to classes.

Students who at the beginning of the college year, and for at least twelve months prior thereto, have been bona fide residents of the State of New York are exempt from payment of tuition; provided, however, that no student shall be allowed to transfer from the College of Forestry to another college in Syracuse University wherein tuition is charged without first paying \$7.00 per hour for the hours for which he may receive credit in the latter college, with the understanding that from the above amount shall be deducted whatever amount has been collected and retained by the College of Forestry for tuition and fees.

Tuition per year (Non-residents)	\$100.00
Matriculation (Paid once)	5.00
Sophomore Summer Camp (Paid once) not including board	25.00
*Library Deposit (Returnable)	5.00

### PER SEMESTER

General Fee, first semester	\$ 20.00
**General Fee, second semester	10.00
Student Activities	1.75

\*The Library deposit will be returned at time of graduation, or on leaving college, if personal notice is given *before* leaving.

\*\*The General Fee for the second semester for students not in attendance the first semester will be \$15.00



Laboratory Fees (all undergraduates) . . . . .	20.00
Laboratory Fees (graduates) . . . . .	25.00

Paper and Pulp students \$10 per semester in addition to regular fee beginning first semester Sophomore year.

Diploma Fee (Paid at time of graduation) . . . . .	10.00
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### DORMITORIES

For circular of information and diagrams of dormitories address the Treasurer of the University.

An advance deposit of \$10.00 must be paid by each student at the office of the Treasurer of the University in the Administration Building when room is engaged or reserved. This payment will be credited upon the first term's bill and will be refunded in case the student does not become or remain a student in the University, provided the room is given up before September 1st.

All remaining payments for rooms and board are payable quarterly in advance, as follows: (1) At the beginning of the college year, (2) the first day after Thanksgiving recess, (3) at the beginning of the second semester, (4) the first day after the Easter vacation.

### SELF-HELP

Students who desire permanent work should confer with the Director of the Appointment Office.

### THE CHARLES LATHROP PACK PRIZE

The Charles Lathrop Pack Foundation was established in 1923 by Mr. Charles Lathrop Pack, President of the American Tree Association; to encourage students in educational institutions in arousing public interest in forestry and to advance forestry education among the people. A prize of \$100 will be presented annually to the student of the New York State College of Forestry selected by the judges as most worthy of such recognition.

### THE BOY SCOUT SCHOLARSHIP

Through arrangements made with the National Headquarters of the Boy Scouts of America, the College awards each year a scholarship equal in value to the amount of one hundred dollars to the Boy Scout in the State of New York who is considered most worthy to be the recipient of this honor. Scouts who desire to become applicants for the scholarship should communicate with Mr. Lorne Barclay, Director of Education, Boy Scouts of America, 200 Fifth Avenue, New York; or with the Registrar



of the College. Final award is made on the basis of Scout and school records of the applicant.

### PHYSICAL TRAINING

Robust health is necessary to attain high scholarship in college and to perform successfully the duties of later life. With this end in view considerable stress is laid upon well-regulated physical training. Every undergraduate student in the College of Forestry is required to take systematic exercise, including swimming in the gymnasium, during the first year of the course unless physically unable to engage in it.

A medical examination is given every student when he enters upon gymnasium work and his exercises are adapted to the requirements of his health and to the development of a sound body.

### ATHLETICS

The athletic interests of the University are in the hands of the Athletic Association. All business is transacted through the Athletic Governing Board, which contains representatives from the faculty, the alumni, the students and interested business men of the city. Through this association the students support teams in all branches of athletics.

### PHOTOGRAPHIC RECORD

For the purpose of a record of all men who enter the College of Forestry and for historical purposes, the College of Forestry requires a cabinet sized photograph of every man who enters the College either in the courses at Syracuse or in the State Ranger School at Wanakena. The photograph will be required to complete registration.

### REQUIREMENTS FOR ADMISSION

Students entering the regular course leading to a degree must offer 15 units of preparatory work of high school grade. A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. Two to three hours of laboratory, drawing or shop work count as equivalent to one hour of recitation. No candidate is eligible for admission to the professional courses if deficient in more than 1 count of entrance conditions. The following subjects are required for admission to the State College of Forestry.

English (four years)	3 Units
History (Ancient, Medieval, English, American, or Modern)	1 "
Mathematics	2½ "

(all applicants must have completed courses in elementary algebra and plane geometry; the extra unit may be made up by offering a half year's credit in Solid Geometry or in Trigonometry).

Language (Greek, Latin, French, German, or Spanish)	2 "
Science	3 "
Elective	3½ "

(Elective units may be offered for extra courses in the subjects listed above; or in Freehand and Mechanical Drawing; Carpenter Shop or Foundry; Economics; Agriculture. Credit cannot be granted for purely commercial subjects like stenography or typewriting, commercial arithmetic, or business writing).

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Total	15 Units
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The College in maintaining a high standard of work believes that satisfactory college work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of forestry and that there is no short cut to the profession. The College urges every young man who is considering the study of forestry to make up his mind to spend all the time necessary for thorough preparation for college work.

Freshmen are accepted only at the beginning of the fall semester. There is no opportunity to enter at midyear except on advanced standing from some other college.

## **UNDERGRADUATE WORK IN THE COLLEGE OF FORESTRY**

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### **I. The Four Year Course in General Forestry Leading to the Degree of Bachelor of Science**

This is essentially a general college course in which the student studies forestry as his major subject. He should realize that it must necessarily fall short of the measure of special training necessary for the professional forestry degree. It is designed for students who desire a somewhat intimate knowledge of various branches of forestry for the general satisfaction which such knowledge gives, or for the use they can make of it in a practical way; for those who wish to prepare themselves to teach certain aspects of forestry in the public schools; or for those who after their college course wish to take subordinate positions in lumbering or manufacturing of forest products or subordinate positions in state or national forest service. Such students will not be entitled to the designation of Professional Foresters merely upon the completion of the four years' course.

### **II. The Four Year Course in Pulp and Paper Manufacture Leading to the Degree of Bachelor of Science**

This course has been established to fill the increasing demand for technical men in the important field of utilization included by the pulp and paper industry. The curriculum of the first year is identical with the general forestry course giving the student the opportunity of determining his future work at the College. The last three years of the course are largely devoted to chemistry, physics, engineering and the technical phases of pulp and paper manufacture. Upon satisfactory completion of the four year program the student should be qualified to enter the pulp and paper industry as a mill control chemist, a technologist in forest products or an operating mill executive.

### **III. The Four Year Course in Landscape and City Forestry Leading to the Degree of Bachelor of Science**

The object of the course is to train men for certain specialized lines of public service which deal with the growing of trees for their aesthetic value, just as the growing of trees for their commercial value is the problem of technical forestry.

The course aims primarily to supply the constantly increasing demand of cities and towns for men with the expert arboricultural knowledge of the forester and the artistic appreciation of the landscape architect, to

care for the trees on their streets, parkways and boulevards and in their parks and reservations. Upon graduation, students should be qualified to act as assistants to city foresters, park superintendents or landscape engineers or to act as construction or planting foremen upon any form of landscape or park work or as draftsmen or designers in landscape, park or city planning organizations.

The care and control of street and park trees is very closely related to park administration and the College aims to make the training so broad that men are prepared for activity in either field.

#### **IV. The Five Year Professional Course Leading to the Degree of Master of Forestry**

This course is designed to prepare professional foresters for higher positions of responsibility in the state service, the national forest service and for the position of expert forester for private concerns. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man must of necessity build his professional training upon a foundation of general culture. It is the unanimous opinion of the leaders in forestry education and in the development of forestry policy in this country, that men who expect to follow the profession of forestry act unwisely if they try to make a short cut by eliminating the foundation training. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting the full measure of time advised for preparation. It is advised that every man who takes the four year undergraduate course in the College will go on and complete his fifth year either immediately following the fourth year or after a year or two of practical work.

The fifth year of this five year course is in reality graduate work and subject to the rules governing graduate work in the College of Forestry.

#### **V. Graduate Work**

Graduate work in the College has been planned with the purpose of training two different types of men—first, the man with a more complete, broad, general training in forestry and, second, the specialist, capable of investigating special economic and scientific problems of forestry. The broad, general training is designed to train men as administrators of state, national or private forest or parks. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting at least five years of study and preparation. For this reason it is strongly urged that students who have shown proper ability in the four year course in the College return and complete a fifth year either immediately following the fourth year or after a year or two of practical work. This five year course leads to the degree of Master of Forestry.

There are a vast number of technical and scientific problems which must be investigated before forestry really comes into its own in this country and such problems can be solved only by the man who has been specially trained in methods of investigation and who is thoroughly conversant with the research in his own field. The College of Forestry is offering graduate work in all phases of scientific forestry such as silviculture, wood technology, forest pathology, forest entomology, forest zoölogy, forest chemistry, etc.

The graduate work is open not only to graduates of forestry courses but under certain restrictions, mentioned in another place, to men whose undergraduate work has been along other scientific lines. Two degrees are open to men taking such work: Master of Science and Doctor of Philosophy, the requirements of which are given at another place.

## **Rules Governing Graduate Work in the College of Forestry**

### **DEGREES OFFERED**

The following degrees will be conferred upon the satisfactory completion of approved schedules of courses and of the other requirements:

Master of Forestry, Master of City Forestry, Master of Science and Doctor of Philosophy.

It should be understood that the time requirements mentioned below are minimum requirements only. The College does not obligate itself to grant degrees, except upon the completion of all the work in a manner satisfactory to its faculty. The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.

### **MAJORS AND MINORS**

At the time of enrolling the candidate for a degree shall submit a schedule consisting of not more than 15 semester hours in each semester. This schedule shall be distributed between a major of nine semester hours and two minors of three semester hours each. If so desired, both the major and one minor may be taken in one department or both minors may be taken in one department. This schedule must receive the approval of the graduate committee and the Dean.

### **REQUIREMENTS FOR THE DEGREE OF MASTER OF FORESTRY**

For the successful prosecution of the work the ability to read German at sight is necessary.

For candidates who are graduates of approved courses in technical forestry a minimum of one year of residence work is required. For gradu-



ates in other courses a minimum of two years' residence work will be necessary.

A thesis or report showing the candidate's ability to complete satisfactorily an investigation upon a topic connected with the candidate's major study must be submitted to the professor in charge not later than May 1st of the year in which the candidate received his degree. This, if approved by the professor in charge, and if acceptable to the graduate committee is so endorsed and a copy is deposited in the library.

Upon the acceptance of his thesis the candidate will be notified and provided he has satisfactorily passed written examinations in all his courses he will at the same time be instructed when to appear for an oral examination. This examination will be given by the professors under whom the candidate's work has been taken—the Dean or some member of the graduate committee acting as chairman. Any member of the faculty is privileged to be present. This examination will not take place later than June 1st.

## REQUIREMENTS FOR THE DEGREE OF MASTER OF CITY FORESTRY

A reading knowledge of French is desirable.

For students who are graduates in the course of City Forestry in this College or who have had equivalent courses, a minimum of one complete year of residence work of acceptable grade along approved lines is required.

Similar requirements with regard to thesis and oral examinations as for the Master of Forestry degree are in force.

## REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

For the successful completion of the work, the ability to read German at sight is necessary.

For students who are graduates in forestry of this institution or others of a similar grade, a minimum of one year of residence work of an acceptable grade is desired.

Students who are graduates in lines other than forestry may be recommended for their degree on the completion of one year of satisfactory residence work provided he has taken at least one minor in forestry. *The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.*

Similar requirements are made as regards thesis and oral examinations as for the preceding two degrees.



## REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

A candidate must be a graduate of a college of approved standing and his undergraduate standing must have been such as to fit him to pursue advanced work in the subject which he chooses as his major. Before beginning the second year of graduate work the candidate must demonstrate his ability to read scientific German and French at sight.

In case the candidate holds merely the bachelor's degree a minimum of three years' graduate work is required. One year's residence in graduate work at another college may be substituted with the approval of the Dean and graduate committee.

At the time of enrolling, the candidate must choose the major study and two minor studies subject to the same rules as those governing other graduate work. If the candidate is not a graduate in forestry at least one of these minors during two years of his course must be in forestry.

A thesis demonstrating the results of scientific research upon a topic bearing upon his major subject must be completed and receive the approval of the major professor not later than May 1st of the year in which the degree is granted. This must be satisfactory to the Dean and graduate committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the College library.

The candidate is required to pass two examinations, both oral. The preliminary examination will be upon the subjects covered by his major and minors. The final examination will be upon the candidate's thesis.

## VI. Training in the State Ranger School

The State Ranger School gives a practical course of one year which trains men very thoroughly for such positions as forest guard, forest ranger, forest estate manager, tree planting expert and nursery foreman. The work is largely of a practical nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of various methods of logging and lumbering and nursery practice and tree planting. It is to be understood that this practical training is not an education in Forestry and that upon completion of the course a man will not be a trained forester. A certificate is given after completion of a year of satisfactory work in the school and a diploma following a year of satis-

factory practice. A special bulletin of the Ranger School will be sent upon application to the Director, New York State Ranger School, Wana-kena, N. Y.

### GROUP ELECTIVE SYSTEM—

In September, 1924, a new system of election known as the *Group Elective System* went into effect. By this system the student will, at the proper place in his course, elect his work in one of the following seven groups.

- I. Silviculture and management.
- II. Forest Entomology and Pathology.
- III. Forest Zoölogy and Recreation.
- IV. Wood Technology and Chemistry.
- V. Utilization.
- VI. Landscape Engineering.
- VII. Pulp and Paper Manufacture.

The students electing the Pulp and Paper course will take the Freshman year as prescribed and start this special work at the beginning of the Sophomore year—taking the program of subjects as prescribed in Group VI.

All other students of the college will complete the Freshman and Sophomore years and the Sophomore Summer Camp. With the beginning of the Junior year they will elect one of the five remaining groups.

Students electing Groups I or II and all students in other groups who have elected the course in Silviculture IV and Engineering XI are required to attend the Senior Camp. This will be in session during the month of May of the Senior year and will be devoted to field work in Silviculture and Management.

## Program of Courses

### FRESHMAN YEAR

Chemistry I	3 hrs.	Chemistry I	3 hrs.
Botany I	3 "	Botany II	4 "
English I	3 "	English I	3 "
Modern Language	3 "	Modern Language	3 "
Mathematics I	3 "	Zoölogy I	3 "
Forestry I	2 "		
	17 hrs.		16 hrs.

## SOPHOMORE YEAR

Geology I	3 hrs.	Geology II	3 hrs.
Wood Technology I	4 "	Wood Technology I	4 "
Engineering I	3 "	Engineering I	3 "
English II	3 "	Entomology I	3 "
Physics XXII or Botany III	3 "	Botany III or Physics XVII	3 "
Drafting and Lettering	1 "	Drafting and Lettering	1 "
	<hr/> 17 hrs.		<hr/> 17 hrs.

SOPHOMER SUMMER CAMP ON CRANBERRY LAKE IN THE ADIRONDACKS, JUNE 1 TO AUGUST 31. Required of all students in Forestry. Prerequisites: Wood Technology I., Engineering I., Botany I. and II., Entomology I. Instruction by members of the various departments. No Junior who has not had the prescribed engineering at the summer camp will be permitted to take Engineering III.

## GROUP I.—SILVICULTURE AND MANAGEMENT

FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED

## JUNIOR YEAR

Silviculture I	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Engineering VI (Finance)	3 "
Botany VI or Entomology II	3 "	Utilization IV	3 "
Engineering III	3 "	Free Elective	3 or 6 "
Free Elective or not	3 "		
	<hr/> 15 or 18 hrs.		<hr/> 15 or 18 hrs.

## SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Silviculture V	2 "	Silviculture IV	3 "
Engineering XI (Regulation)	3 "	Forestry Seminar	2 "
Laws and Policies	2 "	Forest History	3 "
3 or 6 hrs. elective from the following group:		Engineering XII (Applied Management)	3 "
Zoölogy II		2 or 3 hours elective from the following group:	
Engineering V		Ranging and Grazing	
Forest Chemistry II		Zoölogy VI or VII (Alternate)	
National Forest Practice		Engineering VII	
German V		Utilization III, V	
Utilization II		Entomology XVI	
Botany VI		Forest Chemistry II	
Entomology II		Silviculture XI	
Silviculture VI		Wood Technology XIII	2 or 3 "
Silviculture XII	3 or 6 "	Free Elective or not	2 or 3 "
Free Elective or not	3 "		
	<hr/> 15 or 18 hrs.		<hr/> 15 or 18 hrs.

GROUP II.—ENTOMOLOGY AND PATHOLOGY  
FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED

JUNIOR YEAR

Silviculture I	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Forest History	3 "
Botany VI	3 "	Botany XII or	
Entomology II	3 "	Entomology XI or XII	3 "
Elective or not	0 or 3 "	Elective or not	0 or 3 "
	15 or 18 hrs.		15 or 18 hrs.

SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Silviculture V	2 "	Silviculture IV	3 "
Engineering XI (Regulation)	3 "	Mycology or Entomology XVII	3 "
Entomology XIII or Mycology	3 "	Applied Management	
3 or 5 hrs. elective from the		(Engineering XII)	3 "
following:		3 or 4 hrs. elective from the	
Zoölogy II		following:	
Utilization II, XIV		Entomology XI, XII, XV	
National Forest Practice		Zoölogy IV	
Forest Botany XI		Forest Botany XII	
German V		Botany XIII (L.A.)	3 or 4 "
Ecology (L.A.)		Free Elective or not	0 or 3 "
Forest Botany XIV	3 or 5 "		
Free Elective or not	0 or 3 "		15 or 18 hrs.
	15 or 18 hrs.		

GROUP III.—ZOOLOGY AND RECREATION  
FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED

JUNIOR YEAR

Silviculture I	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Forest Zoölogy IV, V or	
Botany VI or Entomology II	3 "	Recreation I	3 "
Forest Zoölogy II, VII or		Forest Zoölogy XI or	
Recreation I	3 "	Recreation II	3 "
Free Elective or not	3 "	Free Elective or not	3 "
	15 or 18 hrs.		15 or 18 hrs.

SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Forest Zoölogy VI or VII		Recreation IV	2 "
alternate or Recreation III	3 "	Forest Zoölogy V or II	3 "
Forest Zoölogy III or XI or		8 hrs. elective from the	
Landscape Engineering II	3 "	following:	
7 hrs. elective from the		Silviculture IV	
following:		Zoölogy XI	
Botany VI		Recreation VI	
Recreation V		Landscape Engineering	
Entomology II, XI, XVII		Engineering VII, XII	
Engineering III, XI		Range and Grazing	
Forest Zoölogy II		Entomology XVI, XVII	
National Forest Practice		History of Forestry - <i>H. F.</i>	
Forest Zoölogy VI or VII		Recreation II	8 "
Recreation II	7 "	Free Elective or not	0 or 3 "
Free Elective or not	0 or 3 "		15 or 18 hrs.
	15 or 18 hrs.		

## GROUP IV.—WOOD TECHNOLOGY AND CHEMISTRY

FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED

## JUNIOR YEAR

Silviculture I	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Organic Chemistry	3 "
Botany VI	3 "	Utilization IV	3 "
Organic Chemistry	3 "	Free Elective or not	3 or 6 "
Free Elective	3 "		
	18 hrs.		15 or 18 hrs.

## SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Utilization XIV (Dry Kiln)	3 "	Wood Technology XIII	1 "
Wood Technology XIII	3 "	(Lab. work in Timber Physics)	
(Timber Physics Lecture)		Forest Chemistry XI	
8 hrs. in electives from:		9 hrs. in electives from:	
Utilization II, III		Utilization I (cont.)	
Quantitative Analysis (L.A.)		V, XI, XII	
Qualitative Analysis (L.A.)		Forest History	
Mathematics II (L.A.)		Qualitative Analysis	
Physics (L.A.)		Quantitative Analysis	
Pulp and Paper Mfg. III		Mathematics III (L.A.)	
Wood Technology XI		Mathematics 104 (L.A.)	
German V		(Diff. Calculus)	
Forest Entomology II		Physics (L.A.)	
Physical Chemistry 110-b		Wood Technology IV	
(L.A.)	8 "	Silviculture IV	
Free Elective	3 "	Physical Chemistry 110-b	
	18 hrs.	(L.A.)	9 "
		Free Elective	3 "
			18 hrs.

## GROUP V.—UTILIZATION

FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED

## JUNIOR YEAR

Silviculture I	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Utilization IA (continued from	
Botany VI or		last semester)	3 "
Entomology II	3 "	Utilization IV	3 "
Utilization III	3 "	Free elective or not	3 or 6 "
Free Elective or not	3 "		
	15 or 18 hrs.		15 or 18 hrs.

## SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Utilization V (Lumber trip)	1 "	Utilization VII (Advanced Wood	
Utilization XIV (Dry Kiln)	3 "	Preservation)	3 "
Utilization VI		10 hrs. from the following or	
6 hrs. from the following or		other courses advised by	
other courses advised by		the Department:	
the Department		Utilization XI, XII, XIII	
Utilization II		Forest Chemistry II	
Forest Chemistry II		Forest History	
Pulp and Paper Mfg. III		Wood Technology XIII (Lab.)	
Engineering III		Wood Technology XIV	
Wood Technology XI, XIII		Silviculture IV	
German V		Engineering VI	10 "
Forest Botany VI	9 "	Free Elective or not	3 "
National Forest Practice	2 "		
Free Elective or not	3 "		15 or 18 hrs.
	15 or 18 hrs.		

## GROUP VI.—LANDSCAPE ENGINEERING

FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED

## JUNIOR YEAR

Silviculture I	3 hrs.	Silviculture III	3 hrs.
Botany VI	3 "	Economics I	3 "
Entomology III	3 "	Botany XII	3 "
Arboriculture I	3 "	Arboriculture I	3 "
Landscape Engineering II	4 "	Landscape Engineering II	4 "
Elective	2 "	Entomology IIIa	2 "
	18 hrs.		18 hrs.

## SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Landscape Engineering III	4 "	Silviculture IV	3 "
Landscape Engineering IV	3 "	Landscape Engineering III	4 "
Landscape Engineering V	3 "	Landscape Engineering IV	3 "
Elementary Architecture	3 "	Arboriculture III	3 "
Elective	3 "	Elective	3 "
	18 hrs.		18 hrs.

## GROUP VII.—PULP AND PAPER MANUFACTURE

FRESHMAN YEAR AS PRESCRIBED

## SOPHOMORE YEAR

Chemistry 20, Qualitative	3 hrs.	Chemistry 20, Qualitative	3 hrs.
Physics I	4 "	Physics I	4 "
English II	3 "	Economics I	3 "
Math. II, Analytics	3 "	Math. III, Analytics	3 "
Drawing I	1 "	Mechanical Drawing III	2 "
Mechanical Drawing II	1 "	Wood Technology I	4 "
Wood Technology I	4 "		
	19 hrs.		19 hrs.

## THREE MONTHS' SUMMER WORK IN A PULP OR PAPER MILL

## JUNIOR YEAR

Chemistry 130, Quantitative	3 hrs.	Chemistry 130, Quantitative	3 hrs.
Forest Chemistry II, Organic	3 "	Forest Chemistry II, Organic	3 "
Rhetoric XV, Public Speaking	3 "	Math. IV. Calculus	3 "
Pulp and Paper Manufacturing:		Pulp and Paper Manufacturing:	
I—Technology	3 "	I—Technology	3 "
II—Laboratory	2 "	II—Laboratory	2 "
III—Machinery	3 "	III—Machinery	3 "
IV—Mill Analyses	2 "	IV—Paper Testing	2 "
	19 hrs.		19 hrs.

## THREE MONTHS' WORK IN A PULP OR PAPER MILL

## SENIOR YEAR

Wood Technology III	3 hrs.	Wood Technology V—Fibres	3 hrs.
Business Law I	2 "	Mechanical Laboratory III	2 "
Heat and Power I	3 "	Electrical Machinery VI	3 "
Electrical Machinery V	3 "	Electrical Laboratory VI	2 "
Electrical Laboratory V	2 "	Pulp and Paper Mfg. VIII— Organization	1 "
Pulp and Paper Mfg. IX— Problem	1 "	Pulp and Paper Mfg. X— Problem	3 "
Pulp and Paper Mfg. VII—Coloring	2 "		
Forest Chemistry XI—Cellulose	3 "		
	19 hrs.		16 hrs.



## Description of Courses in the College of Forestry

Note—A numeral following the title of the course indicates the number of credit hours a week. A credit hour means one recitation (or lecture) hour per week. Three laboratory hours are equivalent to one credit hour. All courses extend through the year unless followed by a Roman numeral, which limits the subject to the semester named.

### Department of Forest Botany

PROFESSOR PENNINGTON; ASSISTANT PROFESSOR BENEDICT;

INSTRUCTOR HIRT; ASSISTANTS PERCIVAL AND ELIASON

*Courses 1, 2, 3, 6 required of undergraduates.*

*Courses 11, 12, 13, 14 elective for graduates or undergraduates.*

*Course 21 for graduates only.*

Students who wish to take special work in Forest Pathology should elect Course 11, the first semester of the junior year.

1. FOREST BOTANY. 3. Required, Freshman. Two hours lecture. Three hours laboratory. An elementary course throughout the first year dealing with structure and functions of plants and the fundamental problems of Botany, together with a general survey of the plant kingdom.—I. Messrs. Pennington, Benedict, Hirt, Percival and Eliason.

2. FOREST BOTANY. 4. Required, Freshmen. A continuation of Forest Botany 1.—II. Messrs. Pennington, Benedict, Hirt, Percival and Eliason.

3. PLANT PHYSIOLOGY. 3. Required, Sophomore. Lectures, recitations, and laboratory. A course designed to teach the fundamental physiological processes involved in growth of plants.—I or II. Mr. Benedict. Prerequisites: Courses 1 and 2.

6. FOREST PATHOLOGY. 3. Required, Junior. Two hour lecture. Three hours laboratory. A course of lectures and laboratory work upon the diseases of plants in general with especial emphasis upon diseases of trees.—I. Messrs. Pennington and Benedict. Prerequisites: Courses 1, 2, and 3.

11. GENERAL MYCOLOGY. 3. Elective. One hour lecture. Four to six hours laboratory. A course in the structure and life histories of fungi.—I. Mr. Benedict. Prerequisites: Courses 1, 2 and 3.

12. ADVANCED FOREST PATHOLOGY. 3. Elective. One hour lecture. Six hours laboratory.—I and II. Mr. Pennington. Prerequisites: Courses 6 and 7.

13. CULTURE METHODS. 3. Elective. Six hours laboratory and conference. A study of technique in the isolation and pure culture of fungi.—II. Mr. Benedict. Prerequisites: Courses 6 and 8.

14. **ADVANCED MYCOLOGY.** 3. Elective. A year course in the classification of fungi.—I and II. Mr. Pennington. Prerequisites: Courses 6 and 11.

21. **RESEARCH IN FOREST BOTANY AND PATHOLOGY.** Elective for graduates.—I and II. Messrs. Bray and Pennington.

## Department of Forest Chemistry

PROFESSORS WISE AND LIBBY; INSTRUCTOR PETERSON;

ASSISTANT MORGAN

*Courses in Forest Chemistry 2 and 11 are required of all students in Groups IV and VII. They are open to properly qualified students in Forestry. All courses in paper and pulp manufacture are required of students entering this field. Forest Chemistry 12 and 21 are open only to properly qualified students.*

## Forest Chemistry

1. **GENERAL INORGANIC CHEMISTRY.** 3. (Four hours optional). Required of all Freshmen. Given in the Department of Chemistry of the College of Liberal Arts.—I and II. Mr. Jordy and Instructors.

2. **ORGANIC CHEMISTRY.** 3. P. and P. Junior required. Two hours lecture and 3 hours laboratory. This is primarily an elementary course in organic chemistry. Prerequisites: Chemistry 1,—I and II. Mr. Wise.

11. **CHEMISTRY OF CELLULOSE.** 3. P. and P. Senior required. Three hours lecture. An elementary course in the chemical and physical properties and the use of cellulose and its derivatives. Prerequisite: Forest Chemistry 2.—I. Mr. Wise.

12. **CHEMISTRY OF CELLULOSE.** 2. Graduate elective. Two hours lecture (or seminar). Lecture will cover researches on the constitution, properties, and uses of cellulose and its derivatives. This is essentially a graduate course. Prerequisites: General Chemistry, Qualitative and Quantitative Analysis, Organic Chemistry, and a reading knowledge of German.—II. Mr. Wise.

13. **SEMINAR.** 1. Elective. One hour weekly. Reports on the recent chemical literature dealing with forest products. Prerequisite: Chemistry 3 or its equivalent.—I and II. Mr. Wise.

21. **RESEARCH IN FOREST CHEMISTRY.** Graduate elective. Hours to be arranged. Problems in forest chemistry and organic chemistry will be assigned to properly qualified graduate students. Prerequisites depend upon the nature of the problem.—I and II. Mr. Wise.

## Pulp and Paper Manufacture

*Special bulletin describing the work of the paper and pulp course should be obtained by writing for it to the Registrar of the College. This course is subject to revision from year to year.*

1. TECHNOLOGY. 3. P. and P. Junior required. Three hours lecture. Study of the processes employed in the manufacture of pulp and paper. Prerequisites or parallel courses: Chemistry 20 and 130.—I and II. Mr. Libby.

2. TECHNOLOGY LABORATORY. 2. P. and P. Junior required. Six hours laboratory. Laboratory demonstrations of the principles of pulp and paper manufacture described in Course 1. Prerequisite or parallel courses Pulp and Paper 1 and 3.—I and II. Mr. Peterson.

3. MACHINERY. 3. P. and P. Junior required. Three hours lecture. Lectures on the design, construction and operation of machinery used in the pulp and paper industry. Prerequisite or parallel courses: Physics 1 and P. and P. 1.—I and II. Mr. Peterson.

4. MILL ANALYSIS. 2. P. and P. Junior required. Six hours laboratory. Evaluation of materials used in the manufacture of pulp and paper. Prerequisite or parallel courses: Chemistry 20 and 130 and P. and P. 1.—I. Mr. Libby.

5. PAPER TESTING. 2. P. and P. Junior required. Six hours laboratory. Physical, chemical and microscopical characteristics of papers. Prerequisites or parallel courses: P. and P. 4.—II. Mr. Libby.

7. COLORING. 2. P. and P. Senior required. Six hours laboratory. Evaluation and identification of dyestuffs and the development of color formulas for dyeing pulp and paper. Prerequisites or parallel courses: P. and P. 4.—I. Mr. Libby.

8. ORGANIZATION. 1. P. and P. Senior required. One hour lecture or discussion. Methods of organization and administration in typical pulp and paper mills. Prerequisites or parallel courses: P. and P. 1 and 3.—II. Mr. Libby.

9. PROBLEM. 1. P. and P. Senior required. A report covering a systematic survey of all available literature on some problem of interest to the pulp and paper industry. Prerequisites or parallel courses: Pulp and Paper Mfg. 3 and 4. Forest Chem. 2 and 3 and Chem. 20 and 130.—I. Messrs. Wise, Libby and Peterson.

10. PROBLEM. 5. P. and P. Senior required. Laboratory development of the problem formulated in course 9. Prerequisite: Pulp and Paper Mfg. 9.—II. Messrs. Wise, Libby and Peterson.

## General Forestry

*Courses 1 and 5 are required of all undergraduates.*

*Course 2 is required of Seniors in Group I; Juniors in Group II; and elective in Groups III and V.*

*Course 3 is required of Seniors in Group I.*

*Course 4 is elective for Seniors.*

1. ELEMENTARY FORESTRY. 2. Two hours lecture. A synoptical course covering the general principles of forestry and its relation to the broad subject of conservation. This course is an introduction to the professional courses in forestry and touches briefly on the more important subjects covered later in silviculture, management, lumbering, utilization and technology.—I. Mr. Brown.

2. HISTORY OF FORESTRY. 3. Three hours lecture. The development of forestry as influenced by the great epochs in world history with especial reference to Germany, France and the United States. Lectures, recitations and reports.—II. Mr. Lee.

3. FOREST LAWS AND POLICIES. 2. Required for Seniors in the Silviculture and Management group. Two hours lecture. The object of this course is to gain knowledge of the important laws affecting the National Forests and Public Domain. The forest laws of the principal states engaged in forestry work will be studied in detail. Forest taxation, legislation, administration and state and national policies will be discussed.—I. Mr. Hoyle.

4. NATIONAL FOREST PRACTICE. 2. Elective. For Seniors. Two hours lecture. The creation and organization of United States Forest Service; with particular reference to the protection, administration and development of the National Forests. Lectures and reports.—I. Mr. Kelleter.

5. FOREST SEMINAR. 2. Required. Assignment and discussion of current forestry subjects.—II. Mr. Fenska.

## Department of Forest Engineering

PROFESSOR FENSKA; ASSISTANT PROFESSOR BELYEA;

INSTRUCTOR MAUGHAN

*Courses 1 and 2 are required of all undergraduates.*

*Summer Camp Engineering is also required.*

*Courses 11 and 12 are elective to graduates and undergraduates.*

*Courses 21 and 22 are elective to graduates only.*

1. PLANE SURVEYING. 3. Required Sophomore. Two hours lecture. Three hours field work. A preliminary course in the use of surveying instruments and field methods. Mapping and office computations.—I and II. Messrs. Fenska and Maughan.

The above course is prerequisite for the Sophomore Summer Camp.

2. **FOREST MENSURATION.** Four weeks at the Sophomore Summer Camp. A study of the measurements of volume of logs, trees and forest; estimating and mapping of timber, compilation of volume tables and collection of data in a detailed study of a forest area by stem analysis for purpose of predicting future possibilities. Messrs. Fenska, Belyea, Maughan and Assistants.

3. **TOPOGRAPHIC SURVEYING.** 3. One hour lecture. Six hours field work. Methods of topographic mapping, by aneroid and pacing, transit and stadia, abney level and slope chain, plane table with telescopic alidade and trigonometric leveling.—I. Messrs. Fenska and Maughan.

Prerequisite: Summer Camp Engineering.

5. **FOREST INCREMENT.** 3. Two hours lecture, one laboratory period. A continuation of Forest Mensuration as applied to the principles of determining increment and yields.—I. Mr. Belyea.

6. **FOREST FINANCE.** 3. Three hours lecture. The business aspects of forest management and the principles of economics and finance underlying the administration of forest properties.—II. Mr. Belyea.

7. **FOREST ENGINEERING.** 3. Three hours lecture. The application of engineering principles in the construction of trails, roads, bridges, logging railroads, chutes, flumes, dams, telephone lines, fire towers, cabins, etc., for the development and proper utilization of a forest.—II. Mr. Fenska.

11. **FOREST REGULATION.** 3. Three hours lecture. Organization of forests for management. The normal and empirical forest, rotation and methods of regulating the cut.—I. Mr. Belyea.

12. **ENGINEERING.** Applied Forest Management. 3 hours. The application of management to specific forests and areas as demonstrated by actual practice in the United States.—II. Mr. Belyea.

21. **ADVANCED FOREST MANAGEMENT.** Elective for Graduate Students only. Individual study of an assigned problem in Forest Management. Hours to be arranged.—I and II. Mr. Belyea.

22. **ENGINEERING.** Advanced Forest Regulation. Elective to graduates only. Actual problems in regulation of the cut will be given the student with seminar consultation and outside reading. 3 hours credit.—II. Mr. Belyea.

## Department of Landscape Engineering

PROFESSOR COX; ASSISTANT PROFESSOR ARNOLD

### Aboriculture

*Course 1 is required of Juniors.*

*Course 3 is required of Seniors.*

*Courses 2 and 4 are elective for undergraduates.*



1. PLANT MATERIALS. 3. Junior required. Lectures, field trips and preparation of planting plans. This course covers deciduous and evergreen shrubs, vines and perennials.—I and II. Mr. Arnold.

2. PRUNING AND CARE OF TREES. 3. Elective. Two hours lecture. Two hours laboratory.—II. Mr. Cox.

3. SHADE AND ORNAMENTAL TREES. 3. Senior required. Three hours lecture. Deciduous and evergreen trees used for shade or ornamental purposes—their identification and use.—II. Mr. Cox. Prerequisite: Arboriculture 1.

4. STREET TREE PLANTING. 2. Elective. One hour lecture. Three hours laboratory. The details of modern City Forestry practice.—II. Mr. Cox.

## Landscape Engineering

*Course 1 is for students in other Colleges; not Forestry.*

*Course 2 is required of Juniors.*

*Courses 3, 4 and 5 are required of Seniors.*

*Course 6 is required of all Sophomores.*

*Courses 21 and 22 are for graduates or specially qualified students.*

1. THE APPRECIATION OF LANDSCAPE ARCHITECTURE. 3. Not open to students of the College of Forestry but to other students of the University. Three hours lecture. The elements and principles of Landscape Design. Lectures and reports.—II. Messrs. Cox and Arnold.

2. LANDSCAPE DESIGN. 4. Six hours drafting, two hours lecture, junior required. Elements and principles of Landscape Engineering.—I and II. Messrs. Cox and Arnold.

3. LANDSCAPE DESIGN. 4. Twelve hours drafting, with occasional lectures, senior required. Elementary designs in Landscape Engineering.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 2.

4. LANDSCAPE ENGINEERING CONSTRUCTION. 3. Senior required. Two hours lecture. Three hours drafting. Highway design and construction, grading and drainage plans, and details of landscape construction.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 2.

5. CITY PLANNING. 3. Senior required. Two hours lecture. One hour reports and assigned reading. The economic, aesthetic and engineering principles of modern City planning.—I. Mr. Cox.

6. DRAFTING AND ENGINEERING. 1. Two hours laboratory with additional hours drafting. Required for all members of the Sophomore class.—I and II. Mr. Cox.

21. LANDSCAPE ENGINEERING DETAILS. 2. Elective. One hour lecture. Three hours drafting. Design of construction used in Landscape Engi-



neering.—I or II. Messrs. Cox and Arnold. Prerequisite: Landscape Engineering 2 and 3.

22. LANDSCAPE ENGINEERING DESIGN. Elective. Advanced landscape engineering design for fifth year students.—I and II. Messrs. Cox and Arnold.

## Department of English

ASSISTANT PROFESSOR LEE

*Course 1 is required of all Freshmen.*

*Course 2 is required of all Sophomores.*

1. ENGLISH. 3. Required, Freshman. The principles of expository writing; the sentence; review; punctuation and spelling; the expository paragraph; organization; word study; accuracy; condensation; letter writing; elements of technical forestry description; long and short themes; class themes. A brief survey of modern English literature is made during the course of the year.—I and II. Mr. Lee and Assistant.

2. ENGLISH. 3. Required, Sophomore. The course is divided into two parts: 1. Advanced problems in technical and professional writing are studied; and 2. Lectures and exercises on the construction and organization of technical and scientific reports.—I. Mr. Lee.

## Department of Forest Entomology

PROFESSOR BLACKMAN; ASSISTANT PROFESSOR HARTLEY;\*

INSTRUCTORS BEAL AND MACANDREWS

*Course 1 is required of all undergraduates in Forestry.*

*Courses 2 and 3 are optional for Juniors and Seniors.*

*Courses 11, 12, 13, 14, 15, 16 and 17 may be taken either as special undergraduate work or as minors in the graduate courses.*

*Course 21 can be taken only as major graduate work.*

1. ELEMENTARY ENTOMOLOGY. 3. Required, Sophomore. Two hours recitation. Three hours laboratory. A general course devoted to the study of morphology, life histories and general classification of insects.—II. Messrs. Blackman, Hartley, DeLeon. Forest Zoölogy 1 is prerequisite for this course.

2. FOREST ENTOMOLOGY. 3. Elective. Two hours lecture. Three hours laboratory. Devoted to a study of those insects of economic importance in Forestry.—I. Mr. Blackman, Mr. Hartley and Assistants. Course 1 is prerequisite.

3. INSECTS AFFECTING SHADE TREES AND ORNAMENTAL SHRUBS. 5. Required, Junior Landscape Engineering. First semester. Two hours

\*Deceased, Oct. 15, 1926.

lecture. Three hours laboratory. Second Semester 1 hour lecture, 3 hours laboratory. Intended primarily for students specializing in City Forestry.—I and II. Mr. Hartley. Course 1 prerequisite.

11. ADVANCED FOREST ENTOMOLOGY. 3. Elective. One hour conference, six hours laboratory or field. Consisting of laboratory work, field work and library investigation.—I or II. Mr. Blackman. Courses 1 and 2 are prerequisite.

12. INSECT ANATOMY. Elective. A more detailed study of the anatomy of certain insects not studied in previous courses. Messrs. Blackman and Hartley.

13. INSECT TAXONOMY. Elective. A more detailed study of classification of some particular group of insects. Mr. Blackman.

14. INSECT HISTOLOGY. Elective. A study of the tissues and microscopic anatomy of insects and the methods used in the preparation of insect material for microscopic study. Mr. Blackman.

15. PROBLEMS IN FOREST ENTOMOLOGY. Elective. Individual study of small problems in forest entomology.—I or II. Messrs. Blackman and Hartley.

16. SEMINAR. 2 hours. Elective. Library investigation, reports and discussion of forest insects of great economic importance. Two hours conference per week. By appointment.—I or II. Mr. Blackman.

17. INSECT ECOLOGY. 3 hours. Elective. Two hours lecture. Three hours laboratory or field. A study of the various interacting environmental or habitat factors which influence the relative abundance and distribution of insects; and the practical application of ecological principles to problems in forest entomology. By appointment.—I or II. Mr. Hartley.

21. RESEARCH PROBLEMS IN FOREST ENTOMOLOGY. Elective. For graduate students.—I and II. Mr. Blackman.

## Department of Recreational Forestry

PROFESSOR FRANCIS

*Courses 1 and 2 are required of all undergraduates in Recreation.*

*Courses 3 and 4 are required of Seniors in Recreation.*

*Courses 2 and 3 are elective for graduates.*

*Courses 5 and 6 are elective for Juniors and Seniors.*

*Course 21 is for graduates only.*

1. RECREATIONAL USES OF FOREST AREAS. 3. Required of Juniors. Two hours lecture. Three hours in field or in assignments. A general course to teach the fundamental principles of the public use of forest areas for recreation and the relation of recreation to other forest uses.—I and II.

2. DEVELOPMENT OF FOREST PARK RECREATIONAL AREAS. 3. Elective. Open to Juniors and Seniors. One hour lecture. Six hours laboratory. This course takes up the elements of structural design.—I and II.

3. PROJECTS IN FORESTRY RECREATION. 3. Required of Seniors. One hour lecture. Six hours laboratory. A course taking up a study of some of the common problems in forest recreation and their logical solution.—I. Prerequisite: Forest Recreation 2.

4. NATIONAL PARK PRACTICE. 2. Required of Seniors. Two hours lecture. A brief history of the laws, practices and policies of the State and National Parks.—II.

5. EUROPEAN PRACTICE IN RECREATIONAL USES OF FORESTS. 3. Elective. Three hours lecture. A study of practices in Germany, France and Switzerland.—I.

6. FOREST RECREATIONAL CAMPS. 3. Elective. One hour lecture. Six hours laboratory. A study of the various types of camps being developed in forested areas for recreational uses.—II.

21. RESEARCH PROBLEMS IN FOREST RECREATION. Graduates only. Hours to be arranged.—I and II.

## Department of Silviculture

PROFESSORS STEPHEN AND PRICHARD

*Courses 1 and 3 are required of all undergraduates.*

*Course 4 is required of Seniors in Groups I, II and VI; elective elsewhere.*

*Course 5 is required of Seniors in Groups I and II; elective elsewhere.*

*Course 6 is elective for undergraduates.*

*Courses 11 and 12 are elective for graduates and undergraduates.*

*Course 21 is elective for graduates only.*

1. SILVICULTURE. ELEMENTARY SILVICULTURE. 3. Two hours lecture. Three hours laboratory. Effect of environment on tree development, the Forest as a society, the effect of the forest on the site, the effect of the site on the forest, moisture conditions within and without the forest, the effect of forest on temperature, soil, etc.—I. Mr. Prichard.

3. SILVICULTURE. SEEDING AND PLANTING. 3. Two hours lecture. Three hours laboratory. A course dealing with all phases of forest propagation especially by seeding and planting.—II. Mr. Prichard.

4. SILVICULTURE. SILVICULTURAL SYSTEMS. 3. Three hours lecture. Field work in Spring Camp. Methods of reproduction of forests as bearing upon silvicultural systems used in this country and abroad and directions for marking to obtain these results.—I. Mr. Prichard.

5. SILVICULTURE. FOREST PROTECTION. 2. Two hours lecture. Protec-

tion of forests from fire, wind, frost, animals, and other destructive agencies.—II. Mr. Prichard.

6. SILVICULTURE. SILVICULTURAL SEMINAR. 2. Elective. Two hours conference and discussion of silvicultural problems. Designed to give the students a thorough review of the literature on silviculture.—I. Messrs. Stephen and Prichard.

11. SILVICULTURE. EXPERIMENT STATION PROBLEMS. 3. Elective. Organization, supervision, opportunities, training, methods and results of silvicultural research. This course is intended to equip a student for carrying on research work in silviculture.—I. Mr. Stephen.

12. SILVICULTURE. REGIONAL STUDIES. 2. Elective. Silvicultural methods applied in the management of the important species in the different forest regions.—I. Messrs. Stephen and Prichard.

21. SILVICULTURAL RESEARCH. ADVANCED SILVICULTURAL PRACTICE. Elective. For graduate students. Hours to be arranged.—I and II. Messrs. Stephen and Prichard.

## Department of Wood Technology

PROFESSOR H. P. BROWN; ASSISTANT PROFESSOR C. C. FORSAITH;

INSTRUCTOR J. E. LODEWICK

*Course 1 is required of all undergraduates.*

*Course 3 is required of all undergraduates except those specializing in Landscape Engineering.*

*Courses 2, 4, 5, 6, 11 and 12 are elective for graduates and undergraduates*

*Course 21 is for graduates only.*

1. ELEMENTARY DENDROLOGY. 3. Required Sophomore. Four hours each semester, 1 hour lecture, 2 hours recitation, and 3 hours laboratory. Studies in the identification and taxonomy of woody plants with special reference to the species native to New York State, and other important forest regions of the United States and abroad. Studies of the silvicultural characteristics and of forest regions are included.—I and II. Mr. Lodewick

2. ORNAMENTAL WOODY PLANTS. 3. Elective. One hour conference and 6 hours laboratory. The identification and taxonomy of ornamental woody plants. (Prerequisite: Wood Technology I.)—I. Mr. Brown.

3. WOOD TECHNOLOGY. 3. Required Junior. One hour lecture and 6 hours laboratory. A study of the structural features of wood. Identification of woods by gross and microscopic structure. The physical properties of wood of value in identification. (Prerequisite: Wood Technology I.)—I. Mr. Brown.

4. PAPER MAKING FIBERS. 3. Elective (required of Pulp and Paper Seniors). A morphological and taxonomic study of the fibers used in paper-making. (Prerequisites: Wood Technology I and III.)—II. Mr. Lodewick.

11. ADVANCED HISTORICAL MORPHOLOGY. 3. Elective. Two hours lecture and three hours laboratory. An evolutionary study of prehistoric and modern woody plants. (Prerequisites: Wood Technology I and III.)—II. Mr. Forsaith.

12. THE MICROTECHNIQUE OF WOODY TISSUE. 3. Elective. One hour lecture and 6 hours laboratory. Preparation of wood for sectioning, the technique of staining, the use of the microtome, and the practice of photography in relation to wood technology. (Prerequisites: Wood Technology I and III). Mr. Lodewick.

13. TIMBER PHYSICS. 3. Elective. Two hours lecture and three hours laboratory. A study of the physical and mechanical properties of wood including descriptive lectures, recitations and strength tests in the laboratory. (Prerequisites: Wood Technology I and III.)—I. Lectures and II. Laboratory Practice. Mr. Forsaith.

14. TIMBERS OF THE WORLD. 3. Elective. One hour lecture and 6 hours laboratory and assigned reading. A survey of the more important timbers of the world from the standpoint of structure, physical properties, identification, and uses. (Prerequisites: Wood Technology I and III.)—II. Mr. Brown.

21. RESEARCH IN DENDROLOGY AND WOOD TECHNOLOGY. Elective for graduates. Hours to be arranged. Messrs. Brown and Forsaith.

## Department of Forest Utilization

PROFESSOR N. C. BROWN; ASSISTANT PROFESSORS HENDERSON,  
HOYLE AND INSTRUCTOR KRAMER

*Courses 1, 3, 4, 5, 6, 7, 12 and 14 are required of all undergraduates electing Utilization.*

*Courses 2, 11, 13 and 21 are elective to graduates and undergraduates who have prerequisites.*

1. LOGGING. 3. Three hours lecture. Required of Juniors. History and development of the lumber industry and its relation to forestry. Detailed studies of logging and transportation. Utilization 5 supplements this course and is required of all students taking Utilization.—I. Mr. Brown.

1A. Continued. LUMBER MANUFACTURE. 3. Three hours lecture. Required of Juniors second semester. Considerable detail is devoted to the work and problems of manufacturing lumber.—II. Mr. Brown.



2. PORTABLE MILLING AND WOODLOT LOGGING. 1. One hour lecture, three hours laboratory for 8 weeks. Elective Junior. The principles and practice of portable mill work and intensive logging and utilization.—I. Mr. Henderson.

3. WOOD PRESERVATION. 3. Two hours lecture and field trips. Required of Juniors. Wood preservatives and methods of treatment. Prerequisites: Wood Technology I.—I. Mr. Kramer.

4. FOREST PRODUCTS. 3. Required of Juniors. Three hours lecture. A study of the so-called minor forest products such as veneer, paper pulp, cooperage, maple sugar, wood distillation, etc.—II. Mr. Brown.

5. FIELD LUMBER STUDY. 3. Following the prerequisite course in Utilization 1, a trip of two weeks to a month's duration is taken either individually or in a party to study the methods of logging and lumber manufacture.—II. Messrs. Brown, Henderson and Hoyle.

6. REGIONAL STUDIES IN LOGGING AND MILLING. 3. Required of Seniors. Three hours lecture. A detailed study will be made to supplement elementary course in Lumbering (Utilization).—I. Mr. Hoyle.

7. ADVANCED WOOD PRESERVATION. 3. Required of Seniors. The wood preserving industry. Construction and operation of wood preserving plants. Management and costs. Detailed studies in the use of treated wood. Prerequisite: Utilization 3.—II. Mr. Kramer.

11. LUMBER SALESMANSHIP. 2. Two hours lecture. Elective, Seniors or graduates. The principles underlying salesmanship with particular reference to lumber, and their application in the American lumber industry.—II. Mr. Hoyle.

12. BUSINESS METHODS IN THE LUMBER INDUSTRY. 3. Required of Seniors. Three hours lecture. A review of particular problems affecting the marketing of lumber.—II. Mr. Brown.

13. AMERICAN LUMBER EXPORT TRADE. 2. Two hours lecture. Elective, Seniors or graduates. A study of export methods, ocean shipping, foreign finance and the present and future markets for American Lumber.—I or II. Mr. Brown.

14. DRY KILN ENGINEERING. 3. Required, Seniors or Graduates. Two hours lecture and three hours laboratory. Consisting of a study of the theoretical and practical application of kiln drying of wood products.—I. Mr. Henderson.

21. SPECIAL PROBLEMS IN UTILIZATION. Elective for Seniors and Graduates. Conferences and special library and laboratory research in the lumber and associated industries. Hours to be arranged.—I or II. Messrs. Brown, Henderson, Hoyle and Kramer.



## Department of Forest Zoology

PROFESSORS JOHNSON AND WHITNEY; INSTRUCTOR PULLING

*Zoölogy 1 is required of all Freshmen.*

*Zoölogy 2, 3, 4, 5, 6, 11 are open to Juniors and Seniors and Graduates.*

*Zoölogy 21 is open only to Graduates.*

These courses are designed as a training in the scientific principles underlying the relation of animals to forest lands and waters, and national and state parks, and the application of these principles to the economic and social problems concerned with birds, fish and game, grazing, fur-bearing, and other forest animals.

1. GENERAL ZOÖLOGY. 3. Required, Freshman. Two hours recitation. Three hours laboratory. A course in general principles of Zoölogy.—II. Mr. Johnson and Mr. Pulling.

2. FISH AND GAME. 3. Elective. One hour lecture. Six hours laboratory or field. A course devoted primarily to a study of the general relations of fish, game, fur-bearing and other forest animals to forestry, emphasizing the administrative, economic and social aspects of the problem.—I. Mr. Johnson and Mr. Pulling. Prerequisite: Zoölogy 1 or equivalent and Entomology 1.

3. ECOLOGY OF FRESH WATER ANIMALS. 3. Elective. One hour lecture. Six hours laboratory or field. This course is intended to give a scientific foundation for the application of animal ecology to the aquatic life of the lakes and streams of forest lands and parks.—I. Mr. Whitney.

4. ECOLOGY OF FOREST ANIMALS. 3. Elective. One hour lecture. Six hours laboratory or field. This course is complementary to the preceding and is devoted to training in the scientific foundations and the application of ecology to the land animals of coniferous and hardwood forests and parks.—I. Mr. Whitney.

5. NATURAL HISTORY OF NATIONAL PARKS AND PRESERVES. 3. Elective. One hour lecture and six hours in laboratory or field. A study of the theory and practice of the principles underlying the appreciation and care of the natural history resources, mainly animals, of National Parks and State and private wild life preserves. Open to Juniors and Seniors.—II. Mr. Whitney.

6. GRAZING AND PREDATORY CONTROL. 3. Elective. Two hours lecture. Three hours laboratory or field. Intended to show the relation of grazing to forest management, including predatory animal and rodent control, particularly in National Forests. Alternate with Zoölogy 7. Prerequisite: Zoölogy 1.—I. Mr. Johnson.

7. FOREST GAME AND FUR ANIMALS. 3. Covering the natural history, of game and fur-bearing animals. To be given in alternate years with

Grazing and Predatory Control. (Zoölogy 6) and to be given in 1927.—I. Mr. Johnson. Prerequisite: Zoölogy 1.

11. PROBLEMS IN FOREST ZOÖLOGY. Elective; hours to be arranged. Individual study of special forest zoölogy problems. Mr. Johnson and Mr. Whitney. Prerequisites: Zoölogy 1, and 2 or 7.

21. ECOLOGICAL RESEARCH IN FOREST ZOÖLOGY. Elective. For graduate students.—I and II. Mr. Johnson and Mr. Whitney.

### **Courses for Students in the College of Forestry Given by Accessory Instructors**

These courses are given by Departments in the College of Liberal Arts, Applied Science and Fine Arts of the University.

#### **BOTANY**

1. RANGE AND GRAZING. 2. Elective. Two hours. Lectures, assigned reading and conference upon range and grazing problems.—II. Mr. Bray. Prerequisites: Forest Botany 1 and 2.

#### **ECONOMICS**

1. THE ELEMENTARY PRINCIPLES OF ECONOMICS IN THEIR RELATION TO FORESTRY. 4. Three hours lecture. This course will present those elementary principles and economic science which are essential as an introduction to a more specialized course in forest economics. Lectures, recitations, readings and reports.—II. Mr. Crafer.

5. BUSINESS LAW. 3. Three hours lecture. A general survey of subjects more closely connected with the ordinary transaction of business.—II. Mr. Skerritt.

#### **FRENCH**

1. ELEMENTARY COURSE. 3. Grammar and reading course. Translation from French into English, and elementary exercises in translating into French. Special emphasis is placed on oral work.—I and II. Mr. Rice.

#### **GEOLOGY**

1. DYNAMIC GEOLOGY. 3. Two hours lecture. Three hours laboratory, or field. A course in general principles emphasizing dynamic processes.—I. Mr. Eaton.

2. HISTORICAL GEOLOGY. 3. Two hours lecture. Two hours laboratory, or field. Historical geology with emphasis of type forms of life, type soils, origin and character together with attention to water and fertilizers.—II. Mr. Eaton.

#### **GERMAN**

1. ELEMENTARY COURSE. 3. A course in elementary German, three recitations a week. Required, Freshmen.—I and II. Mr. Copeland.

## MATHEMATICS

1. TRIGONOMETRY. 3. The solution of triangles with and without logarithms, including the derivation of the necessary formulae; the study of trigonometric functions as functions; the derivation and application of formulae involving the functions of one or more angles; the transformation of expression involving the functions; the solution of trigonometric equations.—I. Mrs. Harwood, Mr. Carrol and Miss Sperry.

## PHYSICS

1. GENERAL PHYSICS. 4. Required of Paper and Pulp students. Three recitation hours, three hours laboratory. Prerequisites: Entrance Physics, or Course 4 of the Department of Physics and Trigonometry.—I and II. Mr. Porter.

22. MECHANICS AND HEAT. 3. Two hours lecture. Three hours laboratory. Lectures recitations and laboratory work on mechanics and heat. Prerequisite: Trigonometry.—I or II. Mr. Karp.

## RHETORIC

14. ESSENTIALS. 2. Principles of speech preparation and delivery. Speeches for special occasions are prepared and delivered. One speech each week and one final long speech. Text book, lectures, criticisms. Required of Seniors who have not had Course 15 or its equivalent.—II. Mr. Kharas.

15. ESSENTIALS. 3. Principles of speech preparation and delivery. Special attention is given to oral reports of experiments and investigations. A limited number of speeches for special occasions are prepared and delivered. One speech each week and one final long speech. Required of Juniors in Pulp and Paper Course.—I. Mr. Kharas.

Those wishing further training in Public Speaking may elect courses in Liberal Arts. For description of such courses see Liberal Arts Bulletin. Mr. Kennedy in charge.

# THE ROOSEVELT WILD LIFE FOREST EXPERIMENT STATION

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FRANKLIN MOON, M.F., *Dean*

## Honorary Advisory Council of the Roosevelt Wild Life Station

### AMERICAN MEMBERS

MRS. CORINNE ROOSEVELT ROBINSON.....	<i>New York City</i>
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MR. KERMIT ROOSEVELT.....	<i>New York City</i>
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### STAFF

Charles Eugene Johnson, A.M., Ph.D.,	<i>Acting Director</i>
Alvin Goodnow Whitney, A.B.,	<i>Assistant Director</i>
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### COLLABORATORS

Edward R. Warren, B.S.
Richard A. Muttikowski, Ph.D.
Milton P. Skinner, B.S.

In May, 1919, the Legislature of New York passed a Bill instructing the Trustees of The New York State College of Forestry, to establish The Roosevelt Wild Life Forest Experiment Station. This station was

created as a memorial to Theodore Roosevelt for his services for wild life forestry. The duties of the Station are, as defined by the New York law, as follows:

"To establish and conduct an experimental station to be known as 'Roosevelt Wild Life Forest Experiment Station' in which there shall be maintained records of the results of the experiments and investigations made and research work accomplished; also a library of works, publications, papers and data having to do with wild life together with means for practical illustrations and demonstrations, which library shall, at all reasonable hours, be open to the public."

Furthermore, the duties of the station are to make "investigations, experiments and research in relation to the habits, life histories, methods of propagation and management of fish, birds, game, and food and fur-bearing animals and forest wild life."

The Station continues the State survey of the wild life of forest lands and waters which the College has been conducting since 1912. Investigations have been made of the fish and fish food of Oneida Lake, the relation of birds to the Adirondack forests, the relation of forest wild life to park visitors in the Palisades Interstate Park, the Alleghany State Park, and through gifts of funds and coöperation in the Yellowstone National Park. The Adirondack beaver and the muskrat in relation to the fur industry have also been studied. The results of recent investigations have been published in the *Roosevelt Wild Life Bulletin*, of which Volume 3 is now being printed. The editions are limited and are not for general distribution. Application for these Station publications should be made to the Director.





BULLETIN

OF

The New York State  
College of Forestry

AT

SYRACUSE UNIVERSITY

FRANKLIN MOON, Dean

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*Announcement of Courses*

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Published Quarterly by  
The New York State College of Forestry  
at Syracuse University

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## CALENDAR FOR 1928-1929

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### 1928

- May 28-June 7. Final Examinations
- June 10.....*Sunday*—Baccalaureate Service, Gymnasium, 10:30 A. M.
- June 11.....*Monday*—Commencement Exercises, Gymnasium, 10 A. M.
- July 3-Aug. 10. First Term of Summer Session
- Aug. 13-Sept. 14. Second Term of Summer Session
- Sept. 10-12..... Entrance Examinations
- Sept. 13..... Health Examinations
- Sept. 17-20..... Fall Registration
- Sept. 17-22..... Freshman Week
- Sept. 19..... Psychological Tests
- Sept. 20..... Minimum Essentials Test
- Sept. 21..... Classes Begin in All Colleges
- Nov. 17..... Middle of First Semester
- Nov. 28-Dec. 3. Thanksgiving Vacation
- Dec. 21-Jan. 3. Christmas Vacation

### 1929

- Jan. 21-Feb. 1. Mid-Year Examinations
- Feb. 2..... End of First Semester
- Feb. 4-7..... Registration for Second Semester
- Feb. 8..... Beginning of Second Semester
- Mar. 28-April 3. Easter Vacation
- April 6..... Middle of Second Semester
- May 27-June 8. Final Examinations
- June 7..... Annual Meeting of Trustees, 9:00 A. M.
- June 8..... Annual Meeting of Alumni Association, 11:00 A. M.
- June 9..... Baccalaureate Service, Gymnasium, 10:30 A. M.
- June 10..... Commencement, Gymnasium, 10:00 A. M.

# TRUSTEES OF THE NEW YORK STATE COLLEGE OF FORESTRY

## Ex-Officio

DR. CHARLES WESLEY FLINT . . . . .	Syracuse, N. Y.
<i>Chancellor</i>	
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<i>Commissioner of Education</i>	
HON. EDWIN CORNING . . . . .	Albany, N. Y.
<i>Lieutenant Governor</i>	
HON. ALEXANDER McDONALD . . . . .	Albany, N. Y.
<i>Conservation Commissioner</i>	

## Appointed by Governor

HON. LOUIS MARSHALL . . . . .	New York City
HON. ALEXANDER T. BROWN . . . . .	Syracuse, N. Y.
HON. JOHN R. CLANCY . . . . .	Syracuse, N. Y.
HON. HAROLD D. CORNWALL . . . . .	Glenfield, N. Y.
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HON. EDWARD H. O'HARA . . . . .	Syracuse, N. Y.
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## Officers of Board

President	Vice-President
LOUIS MARSHALL	JOHN R. CLANCY

## FACULTY OF THE NEW YORK STATE COLLEGE OF FORESTRY

---

CHARLES WESLEY FLINT, M.A., D.D., LL.D., PAED.D.

*Chancellor of the University*

WILLIAM PRATT GRAHAM, PH.D.

*Vice-Chancellor of the University*

FRANKLIN MOON, A.B., 1901 (Amherst), M.F., 1909 (Yale)

*Dean of the College; Professor of Silviculture*

MAULSBY WILLETT BLACKMAN, A.B., 1901, A.M., 1902 (Kansas),  
PH.D., 1905 (Harvard)

*Professor of Forest Entomology*

NELSON COURTLANDT BROWN, A.B., 1906, M.F., 1908 (Yale)

*Professor of Forest Utilization*

LEIGH H. PENNINGTON, A.B., 1907, PH.D., 1909 (Michigan)

*Professor of Forest Botany*

JOHN WALLACE STEPHEN, A.B., 1907, M.F., 1909 (Michigan),  
M.PED. 1915 (Mich. State College)

*Professor of Silviculture*

HARRY P. BROWN, A.B., 1909, A.M., 1910, PH.D., 1914 (Cornell)

*Professor of Wood Technology*

LAURIE D. COX, A.B., 1903, (Acadia College), S.B. in Landscape  
Architecture, 1908 (Harvard)

*Professor of Landscape Engineering*

HENRY R. FRANCIS, B.S., 1910 (Massachusetts Agricultural College)

*Professor of Forest Recreation*

LOUIS E. WISE, A.B., 1907, PH.D., 1911 (Columbia)

*Professor of Forest Chemistry*

REUBEN PARKER PRICHARD, B.S., 1907 (Dartmouth), M.F., 1909  
(Yale)

*Professor of Silviculture*

CLARENCE EARL LIBBY, B.S., IN CHEMICAL ENGINEERING, 1916  
(Maine)

*Professor of Pulp and Paper Manufacture*

JAMES F. DUBUAR, A.B., 1914, M.F., 1915 (Michigan)

*Director and Professor of Forestry, New York State Ranger School*

GURTH A. WHIPPLE

*Professor of Forest Extension*

GUSTAV H. LENTZ, PH.B., 1915, M.F., 1910 (Yale)

*Professor of Forest Extension and Director of Forestry Summer Camp*

RICHARD R. FENSKA, B.S., 1911, (Beloit), M.F., 1913 (Yale)

*Professor of Forest Engineering*

CARLYN CHASE DELEVAN, A.B., 1914, M.S.F., 1915 (Michigan)

*Professor of Forestry at State Ranger School*

CHARLES E. JOHNSON, A.B., 1906, A.M., 1907, PH.D., 1912, (Minnesota)

*Professor of Forest Zoölogy; Director of the Roosevelt Wild Life Forest Experiment Station*

PAUL D. KELLETER, A.B., 1902 (Washington Univ.), M.F., 1904 (Yale)

*Director of Forest Extension*

WALTER W. CHIPMAN, B.S., 1893, A.M., 1904 (Wabash)

*Treasurer*

HIRAM LEROY HENDERSON, A.B., 1915 (Michigan)

*Assistant Professor of Forest Utilization*

CARL CHESWELL FORSAITH, A.B., 1913 (Dartmouth), A.M., 1914, PH.D., 1917 (Harvard)

*Assistant Professor of Wood Technology*

HAROLD CAHILL BELYEA, B.A., 1908, M.A., 1911 (Mount Allison), B.Sc.F., 1911 (New Brunswick), M.F., 1916 (Yale)

*Assistant Professor of Forest Engineering*

ALAN F. ARNOLD (Landscape Architecture, Harvard, 1904-08)

*Assistant Professor of Landscape Engineering*

DON M. BENEDICT, B.S., 1917 (Michigan)

*Assistant Professor of Forest Botany*

RAYMOND J. HOYLE, B.S., 1917 (New York State College of Forestry)

*Assistant Professor of Forest Utilization*

ROSS ARTHUR WILLIAMS, B.S.F., 1921 (Montana), M.F., 1923 (Yale)

*Assistant Professor of Forestry at the State Ranger School*

LAURANCE LEE, B.A., 1915; M.F., 1919 (Yale)

*Registrar; Assistant Professor of English*

FRANK B. MYERS, B.S., 1913, M.F., 1914 (New York State College of Forestry)

*Assistant Professor of Forest Extension*



- JOHN ELTON LODEWICK, B.S., 1919, M.S., 1920, Ph.D., 1927 (New York State College of Forestry)  
*Assistant Professor of Wood Technology*
- S. HEIBERG, B.A., 1921; M.Sc., 1924 (Copenhagen), M.F., 1927 (Yale)  
*Assistant Professor of Silviculture*
- GEORGE P. KRAMER, B.F., 1921 (Penn State Forest School)  
*Assistant Professor of Timber Preservation*
- RAY E. HIRT, B.S., 1917 (Hamline University) M.S., 1924, Ph.D., 1928 (New York State College of Forestry)  
*Assistant Professor of Forest Botany*
- WILFORD A. DENCE, B.S., 1919 (New York State College of Forestry)  
*Assistant Ichthyologist Roosevelt Wild Life Forest Experiment Station*
- ALBERT VAN SICLEN PULLING, B.S., 1915 (New York State College of Forestry)  
*Instructor in Forest Zoölogy*
- WILLIAM MAUGHAN, B.S., 1925 (Minnesota)  
*Instructor in Forest Engineering*
- FLOYD C. PETERSON, B.S., 1924, M.S., 1925 (New York State College of Forestry)  
*Instructor in Pulp and Paper Manufacture*
- AUBREY H. MACANDREWS, B.S., 1925, M.S., 1926 (New York State College of Forestry)  
*Instructor in Forest Entomology*
- \*E. J. ELIASON, B.S., 1923 (Purdue) M.S., 1925 (New York State College of Forestry)  
*Assistant in Forest Botany*
- W. CLEMENT PERCIVAL, B.S., 1923, M.S., 1926 (New York State College of Forestry)  
*Assistant in Forest Botany*
- HOWARD W. MORGAN, B.S., 1926, M.S., 1928 (New York State College of Forestry)  
*Assistant in Forest Chemistry*
- WILLIAM M. HARLOW, B.S., 1925, M.S., 1926 (New York State College of Forestry)  
*Assistant in Wood Technology*
- REGINALD E. BALCH, B.S.A., 1923 (Ontario Agricultural College)  
*Assistant in Forest Entomology*

---

\* On leave, Scandanavian American Fellow, 1927-28.

ELLWOOD S. HARRAR, B.S., 1927 (New York State College of Forestry)  
*Assistant in Wood Technology*

JOSIAH L. LOWE, B.S., 1927 (New York State College of Forestry)  
*Assistant in Forest Botany*

WILLIAM L. NEUBRECH, B.S., 1927 (New York State College of Forestry)  
*Assistant in Utilization*

RUBY W. HOWE  
*Secretary to the Dean*

JAMES H. PINKSTONE  
*Cashier*

ELEANOR CHURCH, B.L.E., 1916 (Syracuse)  
*Librarian*

MARTHA LETITIA MEELIG, B.S. IN L.S., 1927 (Syracuse)  
*Reference Librarian*

# THE NEW YORK STATE COLLEGE OF FORESTRY

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The New York State College of Forestry at Syracuse University was created in 1911 by the legislature of the State of New York. The College is obligated to undertake such special research and state-wide investigation in Forestry as will throw light upon and help in the solution of forestry problems which confront the State and the people of New York, and to serve as the State institution for educational work in Forestry.

## Location of the College and Facilities for Instruction

In 1913 an appropriation of \$250,000 was made for a forestry building to be located on the campus of Syracuse University. The building was completed and ready for occupancy at the beginning of the second semester in the college year 1916-1917, and is one of the best and most effectively equipped buildings for forestry instruction in the United States.

The location of the New York State College of Forestry at Syracuse is particularly advantageous for carrying out the professional training of students and the state-wide educational work. From the city of Syracuse all sections of the Adirondacks and the entire central and northern regions of New York State are readily accessible by railroads, electric lines and highways. The strategic location opens a vast area to field work by the students.

The College is well equipped with apparatus for laboratory work in Forest Botany, Pathology, Dendrology, Wood Technology, Zoölogy, Entomology and Paper and Pulp manufacturing, and with instruments for field work in Forest Mensuration and Surveying.

Excellent library facilities are afforded by the special forest library maintained by the College which is rapidly being enlarged to include the most important literature in all languages covering all phases of forestry and the sciences having a bearing on forestry. Additional library facilities are furnished by the main library of Syracuse University and the Public Library of the city of Syracuse.

## Plan and Scope of Instruction

Undergraduate instruction comprises the following:

Lectures and field instruction in historical and economic aspects of forestry for all students of the University desiring a knowledge of the meaning of forestry.

## SYRACUSE UNIVERSITY

More extended instruction along these lines to those who desire to prepare themselves to teach forestry in the public schools, in co-operation with Teachers College of Syracuse University.

The training of professional foresters for positions in the Federal and State Forest Services, or as experts for private forest work of any kind. This training provides for specialization in Forestry, Lumbering, Forest Utilization, Forest Management, Forest Chemistry, Forest Entomology, Forest Pathology and Forest Zoölogy.

A special undergraduate course in Paper and Pulp making is offered. Complete information of this course is available in a special descriptive circular which may be obtained on application to the College.

### Provision for Graduate Work

The continued advancement in forestry requires a firmer scientific basis. The College acknowledges its responsibility to train men to qualify themselves as competent to carry on independent investigations in the various phases of scientific forestry and in the allied sciences. Further information regarding graduate work will be found on page 18.

### Training in the State Ranger School

The State Ranger School gives a practical course of nine months which trains men very thoroughly for such positions as forest guard, forest ranger, tree planting expert and nursery foreman. The work is largely of a practical nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of various methods of logging and lumbering and nursery practice and tree planting. It is to be understood that this practical training is not an education in Forestry and that upon completion of the course a man will not be a trained forester. A certificate is given after completion of a year of satisfactory work in the school and a diploma following a year of satisfactory practice. A special bulletin of the Ranger School will be sent upon application to the Director, New York State Ranger School, Wanakena, N. Y.

### Extension Activities

Instruction and advice by means of lectures throughout the State, before high schools, granges and other organizations interested in the conservation of natural resources.

The giving of expert advice to owners of land suitable for the practice of forestry.

The publication of popular and technical bulletins and circulars embodying results of research and investigations in forestry.

Special service to producers and consumers of forest products through special market investigations and studies of closer utilization of waste material.

## Special Facilities for Field Work

The College is well equipped with facilities for the essential field work needed by all foresters. The properties available are:

### THE STATE FOREST EXPERIMENT STATION

This Station is located at 4849 South Salina St., in Syracuse, N. Y., and consists of a total area of ninety acres made up of two farms purchased and consolidated in the spring of 1912. Since 1912 experimental work has been conducted on the area. The experimental nursery operated by the College is located on this tract. A wood lot of 30 acres is also located here and is utilized for demonstration purposes.

### THE SALAMANCA FOREST EXPERIMENT STATION

This tract, acquired by purchase in 1912, consists of 1,016 acres and is located south of Salamanca in Cattaraugus County. The forest on this area is a mixed stand of hardwoods consisting of aspen, chestnut, oak and maple. Experimental thinnings have been made and several plantations established in the open portions of the tract. A plan of management has been prepared.

### THE CHITTENANGO FOREST EXPERIMENT STATION

This tract acquired by purchase in 1912 consists of 113 acres, and is located near Chittenango in Madison County. The area at one time was an experimental station of the New York Central Railroad Company.

### COLLEGE FOREST

In 1912 the Rich Lumber Company, of Wanakena, N. Y., presented to Syracuse University for use by the New York State College of Forestry for forestry purposes a tract of 1,850 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks near Wanakena, St. Lawrence County. This area is typical of the cut-over land found in northern New York and is well suited for forestry work. The College Forest is used principally by the students of the State Ranger School at Wanakena, and a forest management plan for its development has been formulated. A branch State Weather Station has been established here. An excellent opportunity for research and experimental work is afforded by the facilities found on this area.

### THE CHARLES LATHROP PACK EXPERIMENTAL FOREST

In 1923 Charles Lathrop Pack presented to Syracuse University for the use of the New York State College of Forestry, a tract of 1,000 acres, situated on Cranberry Lake, known as the "Barber" tract, and on which since 1915 the College of Forestry Camp has been held. This area serves as

a laboratory for the students and is a permanent camp where 12 weeks' practical experience in field methods is given to sophomores each summer from June 1 to August 31. Adjoining this tract are State lands included within the Adirondack Forest Preserve which are available for field demonstration.

### THE CHARLES LATHROP PACK DEMONSTRATION FOREST

In the spring of 1927 an area of 2,250 acres was presented by Charles Lathrop Pack Forestry Trust to Syracuse University for the use of the New York State College of Forestry. This Forest is in the Lake George-Warrensburg region and is located about 3 miles north of Warrensburg on the main highway between New York City and Montreal. Plans for the management of the area have been formulated to demonstrate on this area the practicability of the practice of forestry and to serve as a field laboratory for the studies of silvicultural problems.

### SHORT COURSES

Special short courses covering instruction in kiln drying, in the operation of small sawmills, wood preservation and street tree trimming, are given frequently at the College. These synoptical courses are designed primarily for men actively engaged in these respective fields of operation.

Requests for detailed information of these courses should be addressed to the Dean.

### Publications

From time to time the College issues technical publications, bulletins and circulars on various forestry subjects and problems. A list of such publications will be sent free on application. Most of the publications so listed are for free distribution, while for others a small charge is made.

The News Letter is published quarterly by the College and carries items on the work of the College, news of its Alumni and information of general interest to foresters.

The News Letter is distributed without charge.

Applications for publications should be addressed to the Director of Forest Extension, New York State College of Forestry at Syracuse University, Syracuse, N. Y.

### Communications

All general correspondence should be addressed to the Dean; inquiries and correspondence concerning entrance should be addressed to the Registrar of the New York State College of Forestry at Syracuse University, Syracuse, N. Y.



## GENERAL INFORMATION

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### Expenses

All bills *except* for dormitory rooms and board are payable to W. W. Chipman, Treasurer, New York State College of Forestry at the Treasurer's office, Forestry Building. Checks should be drawn payable to W. W. Chipman, Treasurer.

Payments for dormitory rooms and board are due Syracuse University and such checks should be drawn payable to W. L. Bassett, Treasurer of Syracuse University.

### MATRICULATION

Every student on entering the University is required to pay a matriculation fee of \$5.00. This fee is not required of students passing from one college to another within the University nor of students transferring from another institution if evidence is submitted that such a fee was paid in the former institution. All students entering upon graduate work pay a matriculation fee of \$5.00.

### FEES

All fees for instruction and incidentals are payable twice a year, on or before the first day of each semester. The Treasurer's receipt admits to classes.

Students who at the beginning of the college year, and for at least twelve months prior thereto, have been bona fide residents of the State of New York are exempt from payment of tuition; provided, however, that no student shall be allowed to transfer from the College of Forestry to another college in Syracuse University wherein tuition is charged without first paying \$7.00 per hour for the hours for which he may receive credit in the latter college, with the understanding that from the above amount shall be deducted whatever amount has been collected and retained by the College of Forestry for tuition and fees.

Tuition per year (Non-residents)	\$100.00
Matriculation (Paid once)	5.00
Sophomore Summer Camp (Paid once) not including board	25.00
*Library Deposit (Returnable)	5.00

\*The Library deposit will be returned at time of graduation, or on leaving college, if personal notice is given *before* leaving.

## PER SEMESTER

General Fee, first semester . . . . .	\$ 20.00
*General Fee, second semester . . . . .	10.00
Student Activities . . . . .	2.75
Student Loan Fund and Alumni Association (Sophomore year only)	1.00
Laboratory Fees (all undergraduates) . . . . .	20.00
Laboratory Fees (graduates) . . . . .	25.00

Paper and Pulp students \$10 per semester in addition to regular fee beginning first semester sophomore year.

Diploma Fee (Paid at time of graduation) . . . . .	10.00
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## DORMITORIES

All bills are payable at the office of the Treasurer. Checks should be drawn payable to Syracuse University. In case payment is not made within two weeks of the time it is due, the student is automatically suspended.

An advance deposit of \$10.00 must be paid by each student when room is engaged or reserved, which will be credited upon the first term's bill and will be refunded in case the student does not become or remain a student in the University, provided the room is given up before September 1.

Rental for room is payable one-half at the beginning of each semester, and no refund is made unless substitute is obtained acceptable to the University. Board is payable quarterly in advance on or before September 20, November 20, February 1, April 1. If a student for good and sufficient reasons is obliged to leave the University, the portion of board unused will be refunded.

Men students not in the dormitory or chapter houses must live in houses approved by the University. A list will be sent on request from Dr. L. M. Hickernell, 17-18 Lyman Hall, Syracuse.

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## SELF-HELP

Students who desire permanent work should confer with the Director of the Appointment Office.

## THE CHARLES LATHROP PACK PRIZE

The Charles Lathrop Pack Foundation was established in 1923 by Mr. Charles Lathrop Pack, President of the American Tree Association; to encourage students in educational institutions in arousing public interest

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\*The General Fee for the second semester for students not in attendance the first semester will be \$15.00.

in forestry and to advance forestry education among the people. A prize of \$100 will be presented annually to the student of the New York State College of Forestry selected by the judges as most worthy of such recognition.

### THE BOY SCOUT SCHOLARSHIP

Through arrangements made with the National Headquarters of the Boy Scouts of America, the College awards each year a scholarship equal in value to the amount of one hundred dollars to the Boy Scout in the State of New York who is considered most worthy to be the recipient of this honor. Scouts who desire to become applicants for the scholarship should communicate with Mr. Lorne Barclay, Director of Education, Boy Scouts of America, 200 Fifth Avenue, New York; or with the Registrar of the College. Final award is made on the basis of Scout and school records of the applicant.

### PHYSICAL TRAINING

Good health is necessary to attain high scholarship in college and to perform successfully the duties of later life. With this end in view considerable stress is laid upon well-regulated physical training. Every undergraduate student in the College of Forestry is required to take systematic exercise, including swimming in the gymnasium, during the first year of the course unless physically unable to engage in it.

A medical examination is given every student when he enters upon gymnasium work and his exercises are adapted to the requirements of his health and to the development of a sound body.

The athletic interests of the University are in the hands of the Athletic Association. All business is transacted through the Athletic Governing Board, which includes representatives from the faculty, alumni, students, and interested business men of the city.

## REQUIREMENTS FOR ADMISSION

Students entering the regular course leading to a degree must offer 15 units of preparatory work of high school grade. A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. Two to three hours of laboratory, drawing or shop work count as equivalent to one hour of recitation. No candidate is eligible for admission to the professional courses if deficient in more than 1 count of entrance conditions. The following subjects are required for admission to the State College of Forestry;

English (four years) . . . . .	3	Units
History (Ancient, Medieval, English, American, or Modern) . . . . .	1	"
Mathematics . . . . .	2½	"

(All applicants must have completed courses in elementary algebra and plane geometry; the extra unit may be made up by offering a half year's credit in Solid Geometry, Trigonometry, or Intermediate Algebra.)

Language (Greek, Latin, French, German, or Spanish) . . . . .	2	"
Science . . . . .	3	"
Elective . . . . .	3½	"

(Elective units may be offered for extra courses in the subjects listed above; or in Freehand and Mechanical Drawing; Carpenter Shop or Foundry; Economics; Agriculture. Credit cannot be granted for purely commercial subjects like stenography or typewriting, commercial arithmetic, or business writing.)

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Total . . . . . 15 Units

The College in maintaining a high standard of work believes that satisfactory college work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of forestry and that there is no short cut to the profession. The College urges every young man who is considering the study of forestry to make up his mind to spend all the time necessary for thorough preparation for college work.

Freshmen are accepted only at the beginning of the fall semester. There is no opportunity to enter at midyear except on advanced standing from some other college.

## **UNDERGRADUATE WORK IN THE COLLEGE OF FORESTRY**

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### **I. The Four Year Course in General Forestry Leading to the Degree of Bachelor of Science**

This is essentially a general college course in which the student studies forestry as his major subject. He should realize that it must necessarily fall short of the measure of special training necessary for the professional forestry degree. It is designed for students who desire a somewhat intimate knowledge of various branches of forestry for the general satisfaction which such knowledge gives, or for the use they can make of it in a practical way; for those who wish to prepare themselves to teach certain aspects of forestry in the public schools; or for those who after their college course wish to take subordinate positions in lumbering or manufacturing of forest products or subordinate positions in state or national forest service. Such students will not be entitled to the designation of Professional Foresters merely upon the completion of the four years' course.

### **II. The Four Year Course in Pulp and Paper Manufacture Leading to the Degree of Bachelor of Science**

This course has been established to fill the increasing demand for technical men in the important field of utilization included by the pulp and paper industry. The curriculum of the first year is identical with the general forestry course giving the student the opportunity of determining his future work at the College. The last three years of the course are largely devoted to chemistry, physics, engineering and the technical phases of pulp and paper manufacture. Upon satisfactory completion of the four year program the student should be qualified to enter the pulp and paper industry as a mill control chemist, a technologist in forest products or an operating mill executive.

### **III. The Four Year Course in Landscape and City Forestry Leading to the Degree of Bachelor of Science**

The object of the course is to train men for certain specialized lines of public service which deal with the growing of trees for their aesthetic value, just as the growing of trees for their commercial value is the problem of technical forestry.



The course aims primarily to supply the constantly increasing demand of cities and towns for men with the expert arboricultural knowledge of the forester and the artistic appreciation of the landscape architect, to care for the trees on their streets, parkways and boulevards and in their parks and reservations. Upon graduation, students should be qualified to act as assistants to city foresters, park superintendents or landscape engineers or to act as construction or planting foremen upon any form of landscape or park work or as draftsmen or designers in landscape, park or city planning organizations.

The care and control of street and park trees is very closely related to park administration and the College aims to make the training so broad that men are prepared for activity in either field.

#### **IV. The Five Year Professional Course Leading to the Degree of Master of Forestry**

This course is designed to prepare professional foresters for higher positions of responsibility in the state service, the national forest service and for the position of expert forester for private concerns. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man must of necessity build his professional training upon a foundation of general culture. It is the unanimous opinion of the leaders in forestry education and in the development of forestry policy in this country, that men who expect to follow the profession of forestry act unwisely if they try to make a short cut by eliminating the foundation training. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting the full measure of time advised for preparation. It is advised that every man who takes the four year undergraduate course in the College will go on and complete his fifth year either immediately following the fourth year or after a year or two of practical work.

The fifth year of this five year course is in reality graduate work and subject to the rules governing graduate work in the College of Forestry.

#### **V. Graduate Work**

Graduate work in the College has been planned with the purpose of training two different types of men—first, the man with a more complete, broad, general training in forestry and, second, the specialist, capable of investigating special economic and scientific problems of forestry. The broad, general training is designed to train men as administrators of state, national or private forest or parks. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting at least five years of study and preparation. For this reason it is strongly urged that students who have shown proper ability in the four year course in the



College return and complete a fifth year either immediately following the fourth year or after a year or two of practical work. This five year course leads to the degree of Master of Forestry.

There are a vast number of technical and scientific problems which must be investigated before forestry really comes into its own in this country and such problems can be solved only by the man who has been specially trained in methods of investigation and who is thoroughly conversant with the research in his own field. The College of Forestry is offering graduate work in all phases of scientific forestry such as silviculture, wood technology, forest pathology, forest entomology, forest zoölogy, forest chemistry, etc.

The graduate work is open not only to graduates of forestry courses but under certain restrictions, mentioned in another place, to men whose undergraduate work has been along other scientific lines. Two degrees are open to men taking such work: Master of Science and Doctor of Philosophy.

## **Rules Governing Graduate Work in the College of Forestry**

### **DEGREES OFFERED**

The following degrees will be conferred upon the satisfactory completion of approved schedules of courses and of the other requirements:

Master of Forestry, Master of City Forestry, Master of Science and Doctor of Philosophy.

It should be understood that the time requirements mentioned below are minimum requirements only. The College does not obligate itself to grant degrees, except upon the completion of all the work in a manner satisfactory to its faculty. The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.

### **MAJORS AND MINORS**

At the time of enrolling, the candidate for a degree shall submit a schedule consisting of not more than 15 semester hours in each semester. This schedule shall be distributed between a major of nine semester hours and two minors of three semester hours each. If so desired, both the major and one minor may be taken in one department or both minors may be taken in one department. This schedule must receive the approval of the graduate committee and the Dean.

## REQUIREMENTS FOR THE DEGREE OF MASTER OF FORESTRY

For the successful prosecution of the work the ability to read German at sight is necessary.

For candidates who are graduates of approved courses in technical forestry a minimum of one year of residence work is required. For graduates in other courses a minimum of two years' residence work will be necessary.

A thesis or report showing the candidate's ability to complete satisfactorily an investigation upon a topic connected with the candidate's major study must be submitted to the professor in charge not later than May 1st of the year in which the candidate receives his degree. This, if approved by the professor in charge, and if acceptable to the graduate committee is so endorsed and a copy is deposited in the library.

Upon the acceptance of his thesis the candidate will be notified and provided he has satisfactorily passed written examinations in all his courses he will at the same time be instructed when to appear for an oral examination. This examination will be given by the professors under whom the candidate's work has been taken—the Dean or some member of the graduate committee acting as chairman. Any member of the faculty is privileged to be present. This examination will not take place later than June 1st.

## REQUIREMENTS FOR THE DEGREE OF MASTER OF CITY FORESTRY

A reading knowledge of French is desirable.

For students who are graduates in the course of City Forestry in this College or who have had equivalent courses, a minimum of one complete year of residence work of acceptable grade along approved lines is required.

Similar requirements with regard to thesis and oral examinations as for the Master of Forestry degree are in force.

## REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

For the successful completion of the work, the ability to read German at sight is necessary.

For students who are graduates in forestry of this institution or others of a similar grade, a minimum of one year of residence work of an acceptable grade is desired.

Students who are graduates in lines other than forestry may be recommended for their degree on the completion of one year of satisfactory residence work provided he has taken at least one minor in forestry. *The*

*College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.*

Similar requirements are made as regards thesis and oral examinations as for the preceding two degrees.

### REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

A candidate must be a graduate of a college of approved standing and his undergraduate standing must have been such as to fit him to pursue advanced work in the subject which he chooses as his major. Before beginning the second year of graduate work the candidate must demonstrate his ability to read scientific German and French at sight.

In case the candidate holds merely the bachelor's degree a minimum of three years' graduate work is required. One year's residence in graduate work at another college may be substituted with the approval of the Dean and graduate committee.

At the time of enrolling, the candidate must choose the major study and two minor studies subject to the same rules as those governing other graduate work. If the candidate is not a graduate in forestry at least one of these minors during two years of his course must be in forestry.

A thesis demonstrating the results of scientific research upon a topic bearing upon his major subject must be completed and receive the approval of the major professor not later than May 1st of the year in which the degree is granted. This must be satisfactory to the Dean and graduate committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the College library.

The candidate is required to pass two examinations, both oral. The preliminary examination will be upon the subjects covered by his major and minors. The final examination will be upon the candidate's thesis.

### GROUP ELECTIVE SYSTEM—

In September, 1924, a new system of election known as the *Group Elective System* went into effect. By this system the student will, at the proper place in his course, elect his work in one of the following seven groups;

- I. Silviculture and Management.
- II. Forest Entomology and Pathology.
- III. Forest Zoölogy and Recreation.
- IV. Wood Technology and Chemistry.
- V. Utilization.
- VI. Landscape Engineering.
- VII. Pulp and Paper Manufacture.

The students electing the Pulp and Paper course will take the freshman year as prescribed and start this special work at the beginning of the sophomore year—taking the program of subjects as prescribed in Group VI.

All other students of the college will complete the freshman and sophomore years and the Sophomore Summer Camp. With the beginning of the junior year they will elect one of the five remaining groups.

Students electing Groups I or II and all students in other groups who have elected the course in Silviculture IV and Engineering XI are required to attend the Senior Camp. This will be in session during the month of May of the senior year and will be devoted to field work in Silviculture and Management.

## Program of Courses

### FRESHMAN YEAR

Chemistry I	4 hrs.	Chemistry I	4 hrs.
Botany I	3 "	Botany II	3 "
English I	2 "	English II	2 "
Modern Language	3 "	Modern Language	3 "
Mathematics I	3 "	Mathematics II	3 "
Drawing	2 "	Drawing	2 "
	17 hrs.		17 hrs.

### SOPHOMORE YEAR

Botany III	3 hrs.	Botany IV	3 hrs.
English	2 "	English	2 "
Zoology I	3 "	Entomology I	3 "
Engineering	3 "	Engineering	3 "
*Physics	3 "	*Physics	3 "
Wood Technology	4 "	Wood Technology	4 "
	18 hrs.		18 hrs.

SOPHOMORE SUMMER CAMP ON CRANBERRY LAKE IN THE ADIRONDACKS, JUNE 1 TO AUGUST 31. Required of all students in Forestry. Prerequisites: Wood Technology I, Engineering I, Botany I and II, Entomology I. Instruction by members of the various departments. No junior who has not had the prescribed engineering at the summer camp will be permitted to take Engineering III. All men attending the camp are required to be able to swim.

\*Students who propose to take the Landscape Engineering course will take Architecture instead of Physics.

## GROUP I—SILVICULTURE AND MANAGEMENT

FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED

## JUNIOR YEAR

Silviculture I	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Engineering VI (Finance)	3 "
Botany VI or Entomology II	3 "	Utilization IV	3 "
Engineering III	3 "	Free Elective	3 or 6 "
Free Elective or not	3 "		
	15 or 18 hrs.		15 or 18 hrs.

## SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Silviculture V	2 "	Silviculture IV	3 "
Engineering XI (Regulation)	3 "	Forestry Seminar	2 "
Laws and Policies	2 "	Forest History	3 "
3 or 6 hrs. elective from the following group:		Engineering XII (Applied Management)	3 "
Zoölogy II		2 or 3 hours elective from the following group:	
Engineering V		Ranging and Grazing	
Forest Chemistry II		Zoölogy VI or VII (Alternate)	
National Forest Practice		Engineering VII	
German V		Utilization III, V	
Utilization II		Entomology XVI	
Botany VI		Forest Chemistry II	
Entomology II		Silviculture XI	
Silviculture VI		Wood Technology XIII	2 or 3 "
Silviculture XII	3 or 6 "	Free Elective or not	2 or 3 "
Free Elective or not	3 "		
	15 or 18 hrs.		15 or 18 hrs.

## GROUP II—ENTOMOLOGY AND PATHOLOGY

FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED

## JUNIOR YEAR

Silviculture I	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Forest History	3 "
Botany VI	3 "	Botany XII or	
Entomology II	3 "	Entomology XI or XII	3 "
Elective or not	0 or 3 "	Elective or not	0 or 3 "
	15 or 18 hrs.		15 or 18 hrs.

## SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Silviculture V	2 "	Silviculture IV	3 "
Engineering XI (Regulation)	3 "	Mycology or Entomology XVII	3 "
Entomology XIII or Mycology	3 "	Applied Management (Engineering XII)	3 "
3 or 5 hrs. elective from the following:		3 or 4 hrs. elective from the following:	
Zoölogy II		Entomology XI, XII, XV	
Utilization II, XIV		Zoölogy IV	
National Forest Practice		Forest Botany XII	
Forest Botany XI		Botany XIII (L.A.)	3 or 4 "
German V		Free Elective or not	0 or 3 "
Ecology (L.A.)			
Forest Botany XIV	3 or 5 "		
Free Elective or not	0 or 3 "		
	15 or 18 hrs.		15 or 18 hrs.



**GROUP III—ZOOLOGY AND RECREATION**  
**FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE**  
**SUMMER CAMP AS PRESCRIBED**

**JUNIOR YEAR**

Silviculture I	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Forest Zoölogy IV, V or Recreation I	3 "
Botany VI or Entomology II	3 "	Forest Zoölogy XI or Recreation II	3 "
Forest Zoölogy II, VII or Recreation I	3 "	Free Elective or not	0 or 3 "
Free Elective or not	3 "		
	15 or 18 hrs.		15 or 18 hrs.

**SENIOR YEAR**

Business Law	2 hrs.	Rhetoric	2 hrs.
Forest Zoölogy VI or VII alternate or Recreation III	3 "	Recreation IV	2 "
Forest Zoölogy III or XI or Landscape Engineering II	3 "	Forest Zoölogy V or II	3 "
7 hrs. elective from the following:		8 hrs. elective from the following:	
Botany VI		Silviculture IV	
Recreation V		Zoölogy XI	
Entomology II, XI, XVII		Recreation VI	
Engineering III, XI		Landscape Engineering	
Forest Zoölogy II		Engineering VII, XII	
National Forest Practice		Range and Grazing	
Forest Zoölogy VI or VII		Entomology XVI, XVII	
Recreation II	7 "	History of Forestry	
Free Elective or not	0 or 3 "	Recreation II	8 "
		Free Elective or not	0 or 3 "
	15 or 18 hrs.		15 or 18 hrs.

**GROUP IV—WOOD TECHNOLOGY AND CHEMISTRY**

**FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE**  
**SUMMER CAMP AS PRESCRIBED**

**JUNIOR YEAR**

Silviculture I	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Organic Chemistry	3 "
Botany VI	3 "	Utilization IV	3 "
Organic Chemistry	3 "	Free Elective or not	3 or 6 "
Free Elective	3 "		
	18 hrs.		15 or 18 hrs.

**SENIOR YEAR**

Business Law	2 hrs.	Rhetoric	2 hrs.
Utilization XIV (Dry Kiln)	3 "	Wood Technology XIII	1 "
Wood Technology XIII (Timber Physics Lecture)	3 "	(Lab. work in Timber Physics)	
8 hrs. in electives from:		Forest Chemistry XI	
Utilization II, III		9 hrs. in electives from:	
Quantitative Analysis (L.A.)		Utilization I (cont.)	
Qualitative Analysis (L.A.)		V, XI, XII	
Mathematics II (L.A.)		Forest History	
Physics (L.A.)		Qualitative Analysis (L.A.)	
Pulp and Paper Mfg. III		Quantitative Analysis (L.A.)	
Wood Technology XI		Mathematics III (L.A.)	
German V		Mathematics 104 (L.A.)	
Forest Entomology II		(Diff. Calculus)	
Physical Chemistry 110-b (L.A.)	8 "	Physics (L.A.)	
Free Elective	3 "	Wood Technology IV	
		Silviculture IV	
	18 hrs.	Physical Chemistry 110-b (L.A.)	9 "
		Free Elective	3 "
			18 hrs.



## GROUP V—UTILIZATION

FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED

## JUNIOR YEAR

Silviculture I	3 hrs.	Silviculture III	3 hrs.
Wood Technology III	3 "	Economics I	3 "
Utilization I	3 "	Utilization IA (continued from	
Botany VI or		last semester)	3 "
Entomology II	3 "	Utilization IV	3 "
Utilization III	3 "	Free elective	3 or 6 "
Free Elective or not	3 "		
	15 or 18 hrs.		15 or 18 hrs.

## SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Utilization V (Lumber trip)	1 "	Utilization VII (Advanced Wood	
Utilization XIV (Dry Kiln)	3 "	Preservation)	3 "
Utilization VI		10 hrs. from the following or	
9 hrs. from the following or		other courses advised by	
the Department		the Department:	
Utilization II		Utilization XI, XII, XIII	
Forest Chemistry II		Forest Chemistry II	
Pulp and Paper Mfg. III		Forest History	
Engineering III		Wood Technology XIII (Lab.)	
Wood Technology XI, XIII		Wood Technology XIV	
German V		Silviculture IV	
Forest Botany VI	9 "	Engineering VI	10 "
National Forest Practice		Free Elective or not	3 "
Free Elective or not	3 "		
	15 or 18 hrs.		15 or 18 hrs.

## GROUP VI—LANDSCAPE ENGINEERING

FRESHMAN AND SOPHOMORE YEAR AND SOPHOMORE  
SUMMER CAMP AS PRESCRIBED

## JUNIOR YEAR

Silviculture I	3 hrs.	Silviculture III	3 hrs.
Botany VI	3 "	Economics I	3 "
Entomology III	3 "	Botany XII	3 "
Arboriculture I	3 "	Arboriculture I	3 "
Landscape Engineering II	4 "	Landscape Engineering II	4 "
Elective	2 "	Entomology IIIa	2 "
	18 hrs.		18 hrs

## SENIOR YEAR

Business Law	2 hrs.	Rhetoric	2 hrs.
Landscape Engineering III	4 "	Silviculture IV	3 "
Landscape Engineering IV	3 "	Landscape Engineering III	4 "
Landscape Engineering V	3 "	Landscape Engineering IV	3 "
Elementary Architecture	3 "	Arboriculture III	3 "
Elective	3 "	Elective	3 "
	18 hrs.		18 hrs.

## GROUP VII—PULP AND PAPER MANUFACTURE

## FRESHMAN YEAR AS PRESCRIBED

## SOPHOMORE YEAR

Chemistry 20, Qualitative	3 hrs.	Chemistry 20, Qualitative	3 hrs.
Physics I	4 "	Physics I	4 "
English II	3 "	Economics I	3 "
Math. II, Analytics	3 "	Math. III, Analytics	3 "
Drawing I	1 "	Mechanical Drawing III	2 "
Mechanical Drawing II	1 "	Wood Technology I	4 "
Wood Technology I	4 "		
	19 hrs.		19 hrs.

## THREE MONTHS' SUMMER WORK IN A PULP OR PAPER MILL

## JUNIOR YEAR

Chemistry 130, Quantitative	3 hrs.	Chemistry 130, Quantitative	3 hrs.
Forest Chemistry II, Organic	3 "	Forest Chemistry II, Organic	3 "
Rhetoric XV, Public Speaking	3 "	Math. IV, Calculus	3 "
Pulp and Paper Manufacturing:		Pulp and Paper Manufacturing:	
I—Technology	3 "	I—Technology	3 "
II—Laboratory	2 "	II—Laboratory	2 "
III—Machinery	3 "	III—Machinery	3 "
IV—Mill Analyses	2 "	IV—Paper Testing	2 "
	19 hrs.		19 hrs.

## THREE MONTHS' WORK IN A PULP OR PAPER MILL

## SENIOR YEAR

Wood Technology III	3 hrs.	Wood Technology V—Fibres	3 hrs.
Business Law I	2 "	Mechanical Laboratory III	2 "
Heat and Power I	3 "	Electrical Machinery VI	3 "
Electrical Machinery V	3 "	Electrical Laboratory VI	2 "
Electrical Laboratory V	2 "	Pulp and Paper Mfg. VIII—	
Pulp and Paper Mfg. IX—		Organization	1 "
Problem	1 "	Pulp and Paper Mfg. X—	
Pulp and Paper Mfg. VII—Coloring	2 "	Problem	3 "
Forest Chemistry XI—Cellulose	3 "		
	19 hrs.		16 hrs.

## Description of Courses in the College of Forestry

Note—A numeral following the title of the course indicates the number of credit hours a week. A credit hour means one recitation (or lecture) hour per week. Three laboratory hours are equivalent to one credit hour. All courses extend through the year unless followed by a Roman numeral, which limits the subject to the semester named.

### Department of Forest Botany

PROFESSOR PENNINGTON; ASSISTANT PROFESSOR BENEDICT;

INSTRUCTOR HIRT; ASSISTANTS PERCIVAL AND ELIASON

*Courses 1, 2, 3 required of undergraduates.*

*Courses 6, 11, 12, 13, 14 elective for graduates or undergraduates.*

*Course 21 for graduates only.*

Students who wish to take special work in Forest Pathology should elect Course 11, the first semester of the junior year.

1. FOREST BOTANY. 3. Required, Freshman. Two hours' lecture. Three hours' laboratory. An elementary course throughout the first year dealing with structure and functions of plants and the fundamental problems of Botany, together with a general survey of the plant kingdom.—I. Messrs. Pennington, Benedict, Hirt, Percival and Eliason.

2. FOREST BOTANY. 3. Required, Freshman. A continuation of Forest Botany 1.—II. Messrs. Pennington, Benedict, Hirt, Percival and Eliason.

3. PLANT PHYSIOLOGY. 3. Required, Sophomore. Lectures, recitations, and laboratory. A course designed to teach the fundamental physiological processes involved in growth of plants.—I or II. Mr. Benedict. Prerequisites: Courses 1 and 2.

6. FOREST PATHOLOGY. 3. Elective, Junior. Two hours' lecture. Three hours' laboratory. A course of lectures and laboratory work upon the diseases of plants in general with especial emphasis upon diseases of trees.—I. Messrs. Pennington and Benedict. Prerequisites: Courses 1, 2, and 3.

11. GENERAL MYCOLOGY. 3. Elective. One hour lecture. Four to six hours' laboratory. A course in the structure and life histories of fungi.—I. Mr. Benedict. Prerequisites: Courses 1, 2 and 3.

12. ADVANCED FOREST PATHOLOGY. 3. Elective. One hour lecture. Six hours' laboratory.—I and II. Mr. Pennington. Prerequisites: Courses 6 and 7.

13. CULTURE METHODS. 3. Elective. Six hours' laboratory and conference. A study of technique in the isolation and pure culture of fungi.—II. Mr. Benedict. Prerequisites: Courses 6 and 8.

14. ADVANCED MYCOLOGY. 3. Elective. A year course in the classification of fungi.—I and II. Mr. Pennington. Prerequisites: Courses 6 and 11.

21. RESEARCH IN FOREST BOTANY AND PATHOLOGY. Elective for graduates.—I and II. Messrs. Bray and Pennington.

## Department of Forest Chemistry

PROFESSORS WISE AND LIBBY; INSTRUCTOR PETERSON;

ASSISTANT MORGAN

*Courses in Forest Chemistry 2 and 11 are required of all students in Groups IV and VII. They are open to properly qualified students in Forestry. All courses in paper and pulp manufacture are required of students entering this field. Forest Chemistry 12 and 21 are open only to properly qualified graduate students.*

### Forest Chemistry

1. GENERAL INORGANIC CHEMISTRY. 3. (Four hours optional). Required of all freshmen. Given in the Department of Chemistry of the College of Liberal Arts.—I and II. Mr. Jordy and Instructors.

2. ORGANIC CHEMISTRY. 3. P. and P. Junior required. Two hours' lecture and 3 hours' laboratory. This is primarily an elementary course in organic chemistry. Prerequisites: Chemistry 1,—I and II. Mr. Wise.

11. CHEMISTRY OF CELLULOSE. 3. P. and P. Senior required. Three hours' lecture. An elementary course in the chemical and physical properties and the use of cellulose and its derivatives. Prerequisite: Forest Chemistry 2.—I. Mr. Wise.

12. CHEMISTRY OF CELLULOSE. 2. Graduate elective. Two hours' lecture (or seminar). Lecture will cover researches on the constitution, properties, and uses of cellulose and its derivatives. This is essentially a graduate course. Prerequisites: General Chemistry, Qualitative and Quantitative Analysis, Organic Chemistry, and a reading knowledge of German.—II. Mr. Wise.

13. SEMINAR. 1. Elective. One hour weekly. Reports on the recent chemical literature dealing with forest products. Prerequisite: Chemistry 3 or its equivalent.—I and II. Mr. Wise.

21. RESEARCH IN FOREST CHEMISTRY. Graduate elective. Hours to be arranged. Problems in forest chemistry and organic chemistry will be assigned to properly qualified graduate students. Prerequisites depend upon the nature of the problem.—I and II. Mr. Wise.

### Pulp and Paper Manufacture

*Special bulletin describing the work of the paper and pulp course should be obtained by writing for it to the Registrar of the College. This course is subject to revision from year to year.*

1. TECHNOLOGY. 3. P. and P. Junior required. Three hours' lecture. Study of the processes employed in the manufacture of pulp and paper. Prerequisites or parallel courses: Chemistry 20 and 130.—I and II. Mr. Libby.

2. TECHNOLOGY LABORATORY. 2. P. and P. Junior required. Six

hours' laboratory. Laboratory demonstrations of the principles of pulp and paper manufacture described in Course 1. Prerequisite or parallel courses Pulp and Paper 1 and 3.—I and II. Mr. Peterson.

3. MACHINERY. 3. P. and P. Junior required. Three hours' lecture. Lectures on the design, construction and operation of machinery used in the pulp and paper industry. Prerequisite or parallel courses: Physics 1 and P. and P. 1.—I and II. Mr. Peterson.

4. MILL ANALYSIS. 2. P. and P. Junior required. Six hours' laboratory. Evaluation of materials used in the manufacture of pulp and paper. Prerequisite or parallel courses: Chemistry 20 and 130 and P. and P. 1.—I. Mr. Libby.

5. PAPER TESTING. 2. P. and P. Junior required. Six hours' laboratory. Physical, chemical and microscopical characteristics of papers. Prerequisites or parallel courses: P. and P. 4.—II. Mr. Libby.

7. COLORING. 2. P. and P. Senior required. Six hours' laboratory. Evaluation and identification of dyestuffs and the development of color formulas for dyeing pulp and paper. Prerequisites or parallel courses: P. and P. 4.—I. Mr. Libby.

8. ORGANIZATIONS. 1. P. and P. Senior required. One hour lecture or discussion. Methods of organization and administration in typical pulp and paper mills. Prerequisites or parallel courses: P. and P. 1 and 3.—II. Mr. Libby.

9. PROBLEM. 1. P. and P. Senior required. A report covering a systematic survey of all available literature on some problem of interest to the pulp and paper industry. Prerequisites or parallel courses: Pulp and Paper Mfg. 1 to 5. Forest Chem. 2 and 11 and Chem. 20 and 130.—I. Messrs. Wise, Libby and Peterson.

10. PROBLEM. 5. P. and P. Senior required. Laboratory development of the problem formulated in course 9. Prerequisite: Pulp and Paper Mfg. 9.—II. Messrs. Wise, Libby and Peterson.

## General Forestry

*Courses 1 and 5 are required of all undergraduates.*

*Course 2 is required of seniors in Group I; juniors in Group II; and elective in Groups III and V.*

*Course 3 is required of seniors in Group I.*

*Course 4 is elective for seniors.*

1. ELEMENTARY FORESTRY. 2. Two hours' lecture. A synoptical course covering the general principles of forestry and its relation to the broad subject of conservation. This course is an introduction to the professional courses in forestry and touches briefly on the more important subjects covered later in silviculture, management, lumbering, utilization and technology.—I. Mr. Brown.



2. HISTORY OF FORESTRY. 3. Three hours' lecture. The development of forestry as influenced by the great epochs in world history with especial reference to Germany, France and the United States. Lectures, recitations and reports.—II. Mr. Lee.

3. FOREST LAWS AND POLICIES. 2. Required for seniors in the Silviculture and Management group. Two hours' lecture. The object of this course is to gain knowledge of the important laws affecting the National Forests and Public Domain. The forest laws of the principal states engaged in forestry work will be studied in detail. Forest taxation, legislation, administration and state and national policies will be discussed.—I. Mr. Hoyle.

4. NATIONAL FOREST PRACTICE. 2. Elective for seniors. Two hours' lecture. The creation and organization of United States Forest Service; with particular reference to the protection, administration and development of the National Forests. Lectures and reports.—I. Mr. Kelleter.

5. FOREST SEMINAR. 2. Required. Assignment and discussion of current forestry subjects.—II. Mr. Fenska.

## Department of Forest Engineering

PROFESSOR FENSKA; ASSISTANT PROFESSOR BELYEA;

INSTRUCTOR MAUGHAN

*Courses 1 and 2 are required of all undergraduates.*

*Summer Camp Engineering is also required.*

*Courses 11 and 12 are elective to graduates and undergraduates.*

*Courses 21 and 22 are elective to graduates only.*

1. PLANE SURVEYING. 3. Required Sophomore. Two hours' lecture. Three hours' field work. A preliminary course in the use of surveying instruments and field methods. Mapping and office computations.—I and II. Messrs. Fenska and Maughan. Prerequisite for the Sophomore Summer Camp.

2. FOREST MENSURATION. Four weeks at the Sophomore Summer Camp. A study of the measurements of volume of logs, trees and forest; estimating and mapping of timber, compilation of volume tables and collection of data in a detailed study of a forest area by stem analysis for purpose of predicting future possibilities. Messrs. Fenska, Belyea, Maughan and Assistants.

3. TOPOGRAPHIC SURVEYING. 3. One hour lecture. Six hours' field work. Methods of topographic mapping, by aneroid and pacing, transit and stadia, abney level and slope chain, plane table with telescopic alidade and trigonometric leveling.—I. Messrs. Fenska and Maughan.

Prerequisite: Summer Camp Engineering.



5. **FOREST INCREMENT.** 3. Two hours' lecture, one laboratory period. A continuation of Forest Mensuration as applied to the principles of determining increment and yields.—I. Mr. Belyea.

6. **FOREST FINANCE.** 3. Three hours' lecture. The business aspects of forest management and the principles of economics and finance underlying the administration of forest properties.—II. Mr. Belyea.

7. **FOREST ENGINEERING.** 3. Three hours' lecture. The application of engineering principles in the construction of trails, roads, bridges, logging railroads, chutes, flumes, dams, telephone lines, fire towers, cabins, etc., for the development and proper utilization of a forest.—II. Mr. Fenska.

11. **FOREST REGULATION.** 3. Three hours' lecture. Organization of forests for management. The normal and empirical forest, rotation and methods of regulating the cut.—I. Mr. Belyea.

12. **ENGINEERING.** 3. Applied Forest Management. The application of management to specific forests and areas as demonstrated by actual practice in the United States.—II. Mr. Belyea.

21. **ADVANCED FOREST MANAGEMENT.** Elective for graduate students only. Individual study of an assigned problem in Forest Management. Hours to be arranged.—I and II. Mr. Belyea.

22. **ENGINEERING.** 3. Advanced Forest Regulation. Elective to graduates only. Actual problems in regulation of the cut will be given the student with seminar consultation and outside reading.—II. Mr. Belyea.

## Department of Landscape Engineering

PROFESSOR COX; ASSISTANT PROFESSOR ARNOLD

### Arboriculture

*Course 1 is required of juniors.*

*Course 3 is required of seniors.*

*Courses 2 and 4 are elective for undergraduates.*

1. **PLANT MATERIALS.** 3. Junior required. Lectures, field trips and preparation of planting plans. This course covers deciduous and evergreen shrubs, vines and perennials.—I and II. Mr. Arnold.

2. **PRUNING AND CARE OF TREES.** 3. Elective. Two hours' lecture. Two hours' laboratory.—II. Mr. Cox.

3. **SHADE AND ORNAMENTAL TREES.** 3. Senior required. Three hours' lecture. Deciduous and evergreen trees used for shade or ornamental purposes—their identification and use.—II. Mr. Cox. Prerequisite: Arboriculture 1.

4. **STREET TREE PLANTING.** 2. Elective. One hour lecture. Three hours' laboratory. The details of modern City Forestry practice.—II. Mr. Cox.

## Landscape Engineering

*Course 1 is for students in other Colleges; not Forestry.*

*Course 2 is required of juniors.*

*Courses 3, 4 and 5 are required of seniors.*

*Course 6 is required of all sophomores.*

*Courses 21 and 22 are for graduates or specially qualified students.*

1. THE APPRECIATION OF LANDSCAPE ARCHITECTURE. 3. Not open to students of the College of Forestry but to other students of the University. Three hours' lecture. The elements and principles of Landscape Design. Lectures and reports.—II. Messrs. Cox and Arnold.

2. LANDSCAPE DESIGN. 4. Six hours' drafting, two hours' lecture, junior required. Elements and principles of Landscape Engineering.—I and II. Messrs. Cox and Arnold.

3. LANDSCAPE DESIGN. 4. Twelve hours' drafting, with occasional lectures, senior required. Elementary designs in Landscape Engineering.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 2.

4. LANDSCAPE ENGINEERING CONSTRUCTION. 3. Senior required. Two hours' lecture. Three hours' drafting. Highway design and construction, grading and drainage plans, and details of landscape construction.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 2.

5. CITY PLANNING. 3. Senior required. Two hours' lecture. One hour reports and assigned reading. The economic, aesthetic and engineering principles of modern City planning.—I. Mr. Cox.

6. DRAFTING AND ENGINEERING. 1. Two hours' laboratory with additional hours' drafting. Required for all members of the sophomore class.—I and II. Mr. Cox.

21. LANDSCAPE ENGINEERING DETAILS. 2. Elective. One hour lecture. Three hours' drafting. Design of construction used in Landscape Engineering.—I or II. Messrs. Cox and Arnold. Prerequisite: Landscape Engineering 2 and 3.

22. LANDSCAPE ENGINEERING DESIGN. Elective. Advanced landscape engineering design for fifth year students.—I and II. Messrs. Cox and Arnold.

## Department of English

ASSISTANT PROFESSOR LEE

*Course 1 is required of all freshmen.*

*Course 2 is required of all sophomores.*

1. FRESHMAN COURSE. 2. An intensive drill in the principles of composition and rhetoric together with a brief survey of English and American Literature.—I and II. Mr. Lee and Assistant.

2. SOPHOMORE COURSE. 3. This course is devoted to a study of the application of English in technical and professional writing.—I. Mr. Lee.

## Department of Forest Entomology

PROFESSOR BLACKMAN; INSTRUCTOR MACANDREWS; ASSISTANT BALCH

*Course 1 is required of all undergraduates in Forestry.*

*Courses 2 and 3 are optional for juniors and seniors.*

*Courses 11, 12, 13, 14, 15, 16 and 17 may be taken either as elective undergraduate work or as minors in the graduate courses.*

*Course 21 can be taken only as major graduate work.*

1. Elementary Entomology. 3. Required, Sophomore. Two hours' recitation. Three hours' laboratory. A general course devoted to the study of morphology, life histories and general classification of insects.—II. Messrs. Blackman, MacAndrews, Balch. Forest Zoölogy 1 is prerequisite for this course.

2. FOREST ENTOMOLOGY. 3. Elective. Two hours' lecture. Three hours' laboratory. Devoted to a study of insects of economic importance in Forestry.—I. Messrs. Blackman, MacAndrews and Balch. Course 1 is prerequisite.

3. INSECTS AFFECTING SHADE TREES AND ORNAMENTAL SHRUBS. 5. Required, Junior Landscape Engineering. First semester. Two hours' lecture. Three hours' laboratory. Second semester 1 hour lecture, 3 hours' laboratory. Intended primarily for students specializing in City Forestry.—I and II. Mr. MacAndrews. Course 1 prerequisite.

11. ADVANCED FOREST ENTOMOLOGY. 3. Elective. One hour conference, six hours' laboratory or field. Consisting of laboratory work, field work and library investigation.—I or II. Mr. Blackman. Courses 1 and 2 are prerequisite.

12. INSECT ANATOMY. Elective. A more detailed study of the anatomy of certain insects not studied in previous courses. Messrs. Blackman and Mac Andrews.

13. INSECT TAXONOMY. Elective. A more detailed study of classification of some particular group of insects. Mr. Blackman.

14. INSECT HISTOLOGY. Elective. A study of the tissues and microscopic anatomy of insects and the methods used in the preparation of insect material for microscopic study. Mr. Blackman.

15. PROBLEMS IN FOREST ENTOMOLOGY. Elective. Individual study of small problems in forest entomology.—I or II. Messrs. Blackman and MacAndrews.

16. SEMINAR. 2. Elective. Library investigation, reports and discussion of forest insects of great economic importance. Two hours' conference per week. By appointment.—I or II. Mr. Blackman.

17. INSECT ECOLOGY. 3. Elective. Two hours' lecture. Three hours' laboratory or field. A study of the various interacting environmental or habitat factors which influence the relative abundance and distribution of insects; and the practical application of ecological principles to problems in forest entomology. By appointment.—I or II. Mr. MacAndrews.

21. RESEARCH PROBLEMS IN FOREST ENTOMOLOGY. Elective. For graduate students.—I and II. Mr. Blackman.

## Department of Recreational Forestry

PROFESSOR FRANCIS

*Courses 1 and 2 are required of all undergraduates in Recreation.*

*Courses 3 and 4 are required of seniors in Recreation.*

*Courses 2 and 3 are elective for graduates.*

*Courses 5 and 6 are elective for juniors and seniors.*

*Course 21 is for graduates only.*

1. RECREATIONAL USES OF FOREST AREAS. 3. Required of juniors. Two hours' lecture. Three hours in field or in assignments. A general course to teach the fundamental principles of the public use of forest areas for recreation and the relation of recreation to other forest uses.—I and II.

2. DEVELOPMENT OF FOREST PARK RECREATIONAL AREAS. 3. Elective. Open to juniors and seniors. One hour lecture. Six hours' laboratory. This course takes up the elements of structural design.—I and II.

3. PROJECTS IN FORESTRY RECREATION. 3. Required of seniors. One hour lecture. Six hours' laboratory. A course taking up a study of some of the common problems in forest recreation and their logical solution.—I. Prerequisite: Forest Recreation 2.

4. NATIONAL PARK PRACTICE. 2. Required of seniors. Two hours' lecture. A brief history of the laws, practices and policies of the State and National Parks.—II.

5. EUROPEAN PRACTICE IN RECREATIONAL USES OF FORESTS. 3. Elective. Three hours' lecture. A study of practices in Germany, France and Switzerland.—I.

6. FOREST RECREATIONAL CAMPS. 3. Elective. One hour lecture. Six hours' laboratory. A study of the various types of camps being developed in forested areas for recreational uses.—II.

21. RESEARCH PROBLEMS IN FOREST RECREATION. Graduates only. Hours to be arranged.—I and II.

## Department of Silviculture

PROFESSORS STEPHEN AND PRICHARD; INSTRUCTOR HEIBERG

*Courses 1 and 3 are required of all undergraduates.*

*Course 4 is required of seniors in Groups I, II and VI; elective elsewhere.*

*Course 5 is required of seniors in Groups I and II; elective elsewhere.*

*Course 6 is elective for undergraduates.*

*Courses 11 and 12 are elective for graduates and undergraduates.*

*Course 21 is elective for graduates only.*

1. SILVICULTURE. ELEMENTARY SILVICULTURE. 3. Two hours' lecture. Three hours' laboratory. Effect of environment on tree development, the Forest as a society, the effect of the forest on the site, the effect of the site on the forest, moisture conditions within and without the forest, the effect of forest on temperature, soil, etc.—I. Mr. Prichard.

3. SILVICULTURE. SEEDING AND PLANTING. 3. Two hours' lecture. Three hours' laboratory. A course dealing with all phases of forest propagation especially by seeding and planting.—II. Mr. Prichard.

4. SILVICULTURE. SILVICULTURAL SYSTEMS. 3. Three hours' lecture. Field work in Spring Camp. Methods of reproduction of forests as bearing upon silvicultural systems used in this country and abroad and directions for marking to obtain these results.—I. Mr. Prichard.

5. SILVICULTURE. FOREST PROTECTION. 2. Two hours' lecture. Protection of forests from fire, wind, frost, animals, and other destructive agencies.—II. Mr. Prichard.

6. SILVICULTURE. SILVICULTURAL SEMINAR. 2. Elective. Two hours' conference and discussion of silvicultural problems. Designed to give the students a thorough review of the literature on silviculture.—I. Messrs. Stephen and Prichard.

11. SILVICULTURE. EXPERIMENT STATION PROBLEMS. 3. Elective. Organization, supervision, opportunities, training, methods and results of silvicultural research. This course is intended to equip a student for carrying on research work in silviculture.—I. Mr. Stephen.

12. SILVICULTURE. REGIONAL STUDIES. 2. Elective. Silvicultural methods applied in the management of the important species in the different forest regions.—I. Messrs Stephen and Prichard

21. SILVICULTURAL RESEARCH. ADVANCED SILVICULTURAL PRACTICE. Elective. For graduate students. Hours to be arranged.—I and II. Messrs. Stephen and Prichard.



## Department of Wood Technology

PROFESSOR H. P. BROWN; ASSISTANT PROFESSORS C. C. FORSAITH

AND J. E. LODEWICK

*Course 1 is required of all undergraduates.*

*Course 3 is required of all undergraduates except those specializing in Landscape Engineering.*

*Courses 2, 4, 5, 6, 11 and 12 are elective for graduates and undergraduates.*

*Course 21 is for graduates only.*

1. ELEMENTARY DENDROLOGY. 3. Required Sophomore. Four hours each semester, 1 hour lecture, 2 hours' recitation, and 3 hours' laboratory. Studies in the identification and taxonomy of woody plants with special reference to the species native to New York State, and other important forest regions of the United States and abroad. Studies of the silvicultural characteristics and of forest regions are included.—I and II. Mr. Lodewick.

2. ORNAMENTAL WOODY PLANTS. 3. Elective. One hour conference and 6 hours' laboratory. The identification and taxonomy of ornamental woody plants. (Prerequisite: Wood Technology I.)—I. Mr. Brown.

3. WOOD TECHNOLOGY. 3. Required Junior. One hour lecture and 6 hours' laboratory. A study of the structural features of wood. Identification of woods by gross and microscopic structure. The physical properties of wood of value in identification. (Prerequisite: Wood Technology I.)—I. Mr. Brown.

4. PAPER-MAKING FIBERS. 3. Elective (required of Pulp and Paper seniors). A morphological and taxonomic study of the fibers used in paper-making. (Prerequisites: Wood Technology I and III.)—II. Mr. Lodewick.

11. ADVANCED HISTORICAL MORPHOLOGY. 3. Elective. Two hours' lecture and three hours' laboratory. An evolutionary study of prehistoric and modern woody plants. (Prerequisites: Wood Technology I and III.)—II. Mr. Forsaith.

12. THE MICROTECHNIQUE OF WOODY TISSUE. 3. Elective. One hour lecture and 6 hours' laboratory. Preparation of wood for sectioning, the technique of staining and the use of the microtome. (Prerequisites: Wood Technology I and III.) Mr. Lodewick.

13. TIMBER PHYSICS. 3. Elective. Two hours' lecture and three hours' laboratory. A study of the physical and mechanical properties of wood including descriptive lectures, recitations and practical strength tests. (Prerequisites: Wood Technology I and III.)—I. Lectures and II. Laboratory Practice. Mr. Forsaith.



14. TIMBERS OF THE WORLD. 3. Elective. One hour lecture and 6 hours' laboratory and assigned reading. A survey of the more important timbers of the world from the standpoint of structure, physical properties, identification, and uses. (Prerequisites: Wood Technology I and III.)—II. Mr. Brown.

21. RESEARCH IN DENDROLOGY AND WOOD TECHNOLOGY. Elective for graduates. Hours to be arranged. Messrs. Brown and Forsaith.

## Department of Forest Utilization

PROFESSOR N. C. BROWN; ASSISTANT PROFESSORS HENDERSON,  
HOYLE AND INSTRUCTOR KRAMER

*Courses 1, 3, 4, 5, 6, 7, 12 and 14 are required of all undergraduates electing Utilization.*

*Courses 2, 11, 13 and 21 are elective to graduates and undergraduates who have prerequisites.*

1. LOGGING. 3. Three hours' lecture. Required of juniors. History and development of the lumber industry and its relation to forestry. Detailed studies of logging and transportation. Utilization 5 supplements this course and is required of all students taking Utilization.—I. Mr. Brown.

1A. Continued. LUMBER MANUFACTURE. 3. Three hours' lecture. Required of juniors second semester. Considerable detail is devoted to the work and problems of manufacturing lumber.—II. Mr. Brown.

2. PORTABLE MILLING AND WOODLOT LOGGING. 1. One hour lecture, three hours' laboratory for 8 weeks. Elective Junior. The principles and practice of portable mill work and intensive logging and utilization.—I. Mr. Henderson.

3. WOOD PRESERVATION. 3. Two hours' lecture and field trips. Required of juniors. Wood preservatives and methods of treatment. Prerequisites: Wood Technology I.—I. Mr. Kramer.

4. FOREST PRODUCTS. 3. Required of juniors. Three hours' lecture. A study of the so-called minor forest products such as veneer, paper pulp, cooperage, maple sugar, wood distillation, etc.—II. Mr. Brown.

5. FIELD LUMBER STUDY. 3. Following the prerequisite course in Utilization 1, a trip of two weeks to a month's duration is taken either individually or in a party to study the methods of logging and lumber manufacture.—II. Messrs. Brown, Henderson and Hoyle.

6. REGIONAL STUDIES IN LOGGING AND MILLING. 3. Required of seniors. Three hours' lecture. A detailed study will be made to supplement elementary course in Lumbering (Utilization).—I. Mr. Hoyle.

7. ADVANCED WOOD PRESERVATION. 3. Required of seniors. The wood preserving industry. Construction and operation of wood pre-

serving plants. Management and costs. Detailed studies in the use of treated wood. Prerequisite: Utilization 3.—II. Mr. Kramer.

11. LUMBER SALESMANSHIP. 2. Two hours' lecture. Elective, seniors or graduates. The principles underlying salesmanship with particular reference to lumber, and their application in the American lumber industry.—II. Mr. Hoyle.

12. BUSINESS METHODS IN THE LUMBER INDUSTRY. 3. Required of seniors. Three hours' lecture. A review of particular problems affecting the marketing of lumber.—II. Mr. Brown.

13. AMERICAN LUMBER EXPORT TRADE. 2. Two hours' lecture. Elective, seniors or graduates. A study of export methods, ocean shipping, foreign finance and the present and future markets for American Lumber.—I or II. Mr. Brown.

14. DRY KILN ENGINEERING. 3. Required, seniors or graduates. Two hours' lecture and three hours' laboratory. Consisting of a study of the theoretical and practical application of kiln drying of wood products.—I. Mr. Henderson.

21. SPECIAL PROBLEMS IN UTILIZATION. Elective for seniors and graduates. Conferences and special library and laboratory research in the lumber and associated industries. Hours to be arranged.—I or II. Messrs. Brown, Henderson, Hoyle and Kramer.

## Department of Forest Zoology

PROFESSOR JOHNSON; INSTRUCTOR PULLING

*Zoölogy I is required of all freshmen.*

*Zoölogy 2, 3, 4, 5, 6, and 11 are open to juniors and seniors and graduates.*

*Zoölogy 21 is open only to graduates.*

These courses are designed as a training in the scientific principles underlying the relation of animals to forest lands and waters, and national and state parks, and the application of these principles to the economic and social problems concerned with birds, fish and game, grazing, fur-bearing, and other forest animals.

1. GENERAL ZOÖLOGY. 3. Required, Freshman. Two hours' recitation. Three hours' laboratory. A course in general principles of Zoölogy.—I. Mr. Johnson and Mr. Pulling.

2. FISH AND GAME. 3. Elective. Two hours' lecture. Three hours' laboratory or field. A course devoted primarily to a study of the general relations of fish, game, fur-bearing and other forest animals to forestry, emphasizing the administrative, economic and social aspects of the problem. Prerequisite: Zoölogy 1 or equivalent and Entomology 1.—I. Mr. Johnson and Mr. Pulling.

3. ECOLOGY OF FRESH WATER ANIMALS. 3. Elective. Two hours' lecture. Three hours' laboratory or field. This course is intended to give a scientific foundation for the application of animal ecology to the aquatic life of the lakes and streams of forest lands and parks.—I.

4. ECOLOGY OF FOREST ANIMALS. 3. Elective. Two hours' lecture. Three hours' laboratory or field. This course is complementary to the preceding and is devoted to training in the scientific foundations and the application of ecology to the land animals of coniferous and hardwood forests and parks.—I.

5. NATURAL HISTORY OF NATIONAL PARKS AND PRESERVES. 3. Elective. Two hours' lecture and three hours in laboratory or field. A study of the theory and practice of wild life, conservation, and the principles underlying the appreciation and care of the natural history resources, mainly animals, of National and State Parks and wild life preserves. Open to juniors and seniors.—II.

6. GRAZING AND PREDATORY ANIMAL CONTROL. 3. Elective. Two hours' lecture. Three hours' laboratory or field. Intended to show the relation of grazing to forest management, including predatory animal and rodent control, particularly in National Forests. Alternate in even numbered years with Zoölogy 7. Prerequisite: Zoölogy 1.—I. Mr. Johnson.

7. FOREST GAME AND FUR ANIMALS. 3. Covering the natural history, of game and fur-bearing animals. Alternate in odd numbered years with Grazing and Predatory Control. (Zoölogy 6) and not to be given in 1928. Prerequisite: Zoölogy 1.—I. Mr. Johnson.

11. PROBLEMS IN FOREST ZOÖLOGY. Elective; hours to be arranged. Individual study of special forest zoölogy problems. Prerequisites: Zoölogy 1, and 2 or 7. Mr. Johnson.

21. ECOLOGICAL RESEARCH IN FOREST ZOÖLOGY. Elective. For graduate students.—I and II. Mr. Johnson.

### Courses for Students in the College of Forestry Given by Accessory Instructors

These courses are given by Departments in the Colleges of Liberal Arts, Applied Science and Fine Arts of the University.

#### BOTANY

1. RANGE AND GRAZING. 2. Elective. Two hours. Lectures, assigned reading and conference upon range and grazing problems.—II. Mr. Bray. Prerequisites: Forest Botany 1 and 2.

## ECONOMICS

1. THE ELEMENTARY PRINCIPLES OF ECONOMICS IN THEIR RELATION TO FORESTRY. 4. Three hours' lecture. This course will present those elementary principles and economic science which are essential as an introduction to a more specialized course in forest economics. Lectures, recitations, readings and reports.—II. Mr. Crafer.

5. BUSINESS LAW. 3. Three hours' lecture. A general survey of subjects more closely connected with the ordinary transaction of business.—II. Mr. Skerritt.

## FRENCH

18. FOURTH YEAR FRENCH. 3. Open to those offering three years of French for entrance. I and II.

20. THIRD YEAR FRENCH. 3. For those offering two years of French for entrance. I and II.

## GEOLOGY

1. DYNAMIC GEOLOGY. 3. Two hours' lecture. Three hours' laboratory, or field. A course in general principles emphasizing dynamic processes.—I. Mr. Eaton.

2. HISTORICAL GEOLOGY. 3. Two hours' lecture. Two hours' laboratory, or field. Historical geology with emphasis of type forms of life, type soils, origin and character together with attention to water and fertilizers.—II. Mr. Eaton.

## GERMAN

1. ELEMENTARY COURSE. 3. A course in elementary German, three recitations a week. Required, Freshmen.—I and II. Mr. Copeland.

3. INTERMEDIATE COURSE. 3. A course designed for those offering two years of German for entrance. I and II. Mr. Copeland.

5. SCIENTIFIC GERMAN. 3. The reading of works of scientific nature in German. Open only to those offering three years of German for entrance. I and II. Mr. Kullmer.

## MATHEMATICS

1. ALGEBRA. 3. Review of the principles of Algebra in preparation for Trigonometry. I. Staff.

2. TRIGONOMETRY. 3. The solution of triangles with and without logarithms, including the derivation of the necessary formulae; the study of trigonometric functions as functions; the derivation and application of formulae involving the functions of one or more angles; the transformation of expression involving the functions; the solution of trigonometric equations.—II. Mrs. Harwood, Mr. Carroll and Miss Sperry.

## PHYSICS

1. GENERAL PHYSICS. 4. Required of Paper and Pulp students. Three recitation hours, three hours' laboratory. Prerequisites: Entrance Physics, or Course 4 of the Department of Physics and Trigonometry.—I and II. Mr. Porter.

22. MECHANICS AND HEAT. 3. Two hours' lecture. Three hours' laboratory. Lectures, recitations and laboratory work on mechanics and heat. Prerequisite: Trigonometry.—I or II. Mr. Porter.

## RHETORIC

14. ESSENTIALS. 2. Principles of speech preparation and delivery. Speeches for special occasions are prepared and delivered. One speech each week and one final long speech. Text book, lectures, criticisms. Required of seniors who have not had Course 15 or its equivalent.—II. Mr. Knower.

15. ESSENTIALS. 3. Principles of speech preparation and delivery. Special attention is given to oral reports of experiments and investigations. A limited number of speeches for special occasions are prepared and delivered. One speech each week and one final long speech. Required of juniors in Pulp and Paper Course.—I. Mr. Knower.

Those wishing further training in Public Speaking may elect courses in Liberal Arts. Mr. Kennedy in charge.

# THE ROOSEVELT WILD LIFE FOREST EXPERIMENT STATION

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FRANKLIN MOON, M.F., Dean

Honorary Advisory Council of the  
Roosevelt Wild Life Station

## AMERICAN MEMBERS

MRS. CORINNE ROOSEVELT ROBINSON.....	<i>New York City</i>
HON. THEODORE ROOSEVELT.....	<i>New York City</i>
MR. KERMIT ROOSEVELT.....	<i>New York City</i>
DR. GEORGE BIRD GRINNELL.....	<i>New York City</i>
DR. GIFFORD PINCHOT.....	<i>Harrisburg, Pa.</i>
MR. CHAUNCEY J. HAMLIN.....	<i>Buffalo, N. Y.</i>
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DR. FRANK M. CHAPMAN.....	<i>New York City</i>
DEAN HENRY S. GRAVES.....	<i>New Haven, Conn.</i>

## EUROPEAN MEMBERS

VISCOUNT GREY.....	<i>Falldon, England</i>
SIR HARRY H. JOHNSON.....	<i>Arundel, England</i>

## STAFF

Charles Eugene Johnson, A.M., Ph.D.,	<i>Director</i>
Wilford A. Dence, B.S.,	<i>Assistant Ichthyologist</i>

## COLLABORATORS

William Converse Kendall, A.M., M.D.
Edward R. Warren, B.S.
Richard A. Muttikowski, Ph.D.
Milton P. Skinner, B.S.

In May, 1919, the Legislature of New York passed a Bill instructing the Trustees of The New York State College of Forestry, to establish



The Roosevelt Wild Life Forest Experiment Station. This station was created as a memorial to Theodore Roosevelt for his services for wild life forestry. The duties of the Station are, as defined by the New York law, as follows:

"To establish and conduct an experimental station to be known as 'Roosevelt Wild Life Forest Experiment Station' in which there shall be maintained records of the results of the experiments and investigations made and research work accomplished; also a library of works, publications, papers and data having to do with wild life together with means for practical illustrations and demonstrations, which library shall, at all reasonable hours, be open to the public."

Furthermore, the duties of the station are to make "investigations, experiments and research in relation to the habits, life histories, methods of propagation and management of fish, birds, game, and food and fur-bearing animals and forest wild life."

The Station continues the State survey of the wild life of forest lands and waters which the College has been conducting since 1912. Investigations have been made of the fish and fish food of Oneida Lake, the relation of birds to the Adirondack forests, the relation of forest wild life to park visitors in the Palisades Interstate Park, the Alleghany State Park, and through gifts of funds and coöperation in the Yellowstone National Park. The Adirondack beaver and the muskrat in relation to the fur industry have also been studied. The results of recent investigations have been published in the *Roosevelt Wild Life Bulletin*, of which Volume 4 is now being printed. The editions are limited and do not admit of general free distribution. Application for these Station publications should be made to the Director.



BULLETIN  
OF  
The New York State  
College of Forestry  
AT  
SYRACUSE UNIVERSITY  
FRANKLIN MOON, Dean

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Circular No. 60

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*Announcement of Courses*



1929 - 1930

Published Quarterly by The New York State College of Forestry  
at Syracuse University

Entered as second-class matter, Oct. 18, 1927, at the Post Office  
at Syracuse, New York, under Act of Aug. 24, 1912

# CALENDAR

1929—1930

1929

- July 2-Aug. 9. *Tuesday-Friday*—Summer Session, First Term  
 Aug. 12-Sept. 13. *Monday-Friday*—Summer Session, Second Term  
 Sept. 4-Sept. 18. *Wednesday-Wednesday*—Summer Surveying Camp  
 Sept. 9-Sept. 11. *Monday-Wednesday*—Entrance Examinations  
 Sept. 9-Sept. 14. *Monday-Saturday*—Supplementary Examinations  
 Sept. 13-Sept. 14. *Friday-Saturday*—Health Examinations  
 Sept. 16-Sept. 17. *Monday-Tuesday*—Registration for Freshman  
 Sept. 16-Sept. 21. *Monday-Saturday*—Freshman Week  
 Sept. 18-Sept. 19. *Wednesday-Thursday*—Registration; Sophomores, Juniors, Seniors  
 Sept. 20. . . . . *Friday, 8:00 A. M.*—Classes begin in all colleges  
 Nov. 12. . . . . *Tuesday*—Meeting of Trustees, 9:00 A. M.  
 Nov. 16. . . . . *Saturday*—Middle of First Semester  
 Nov. 27-Nov. 30. *Wednesday, 12:00 M.-Saturday*—Thanksgiving Vacation  
 Dec. 20-Jan. 2. *Friday, 12 M.-Thursday, 8:00 A. M.*—Christmas Vacation

1930

- Jan. 20-Jan. 31. *Monday-Friday*—Mid-year Examinations  
 Jan. 27-Jan. 29. *Monday-Wednesday*—Entrance Examinations  
 Feb. 1. . . . . *Saturday*—First Semester ends  
 Feb. 3-Feb. 6. *Monday-Thursday*—Registration for Second Semester  
 Feb. 7. . . . . *Friday*—Classes begin  
 Apr. 17-Apr. 23. *Thursday 12:00 M.-Wednesday*—Easter Vacation  
 Apr. 5. . . . . *Saturday*—Middle of Second Semester  
 Apr. 21-Apr. 26. *Monday-Saturday*—Supplementary Examinations  
 May 26-June 7. *Monday-Saturday*—Final Examinations  
 June 6. . . . . *Friday*—Annual Meeting of Trustees, 9:00 A. M.  
 June 7. . . . . *Saturday*—Annual Meeting of Alumni Association, 11:00 A. M.  
 June 8. . . . . *Sunday*—Baccalaureate Service, Gymnasium, 10:30 A. M.  
 June 9. . . . . *Monday*—Commencement, Gymnasium, 10:00 A. M.

## SCHOOL OF EXTENSION TEACHING

1929

- Sept. 11-Sept. 24. . . . . *Wednesday-Tuesday*—Registration for First Semester  
 Sept. 25. . . . . *Wednesday*—Classes begin  
 Nov. 27-Nov. 30. . . . . *Wednesday, 12:00 M.-Saturday*—Thanksgiving Vacation  
 Dec. 20-Jan. 2. . . . . *Friday, 12:00 M.-Thursday, 8:00 A. M.*—Christmas Vacation

1930

- Jan. 27-Feb. 1. . . . . *Monday-Saturday*—Mid-year Examinations  
 Jan. 27-Feb. 6. . . . . *Monday-Thursday*—Registration for Second Semester  
 Feb. 7. . . . . *Friday*—Classes begin  
 Apr. 17-Apr. 23. . . . . *Thursday, 12:00 M.-Wednesday*—Easter Vacation  
 May 30-June 5. . . . . *Friday-Thursday*—Final Examinations

# TRUSTEES OF THE NEW YORK STATE COLLEGE OF FORESTRY

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## Ex-Officio

DR. CHARLES WESLEY FLINT . . . . .	Syracuse, N. Y.
<i>Chancellor</i>	
DR. FRANK P. GRAVES . . . . .	Albany, N. Y.
<i>Commissioner of Education</i>	
HON. HERBERT H. LEHMAN . . . . .	Albany, N. Y.
<i>Lieutenant-Governor</i>	
HON. ALEXANDER McDONALD . . . . .	Albany, N. Y.
<i>Conservation Commissioner</i>	

## Appointed by Governor

HON. LOUIS MARSHALL . . . . .	New York City
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HON. JOHN R. CLANCY . . . . .	Syracuse, N. Y.
HON. HAROLD D. CORNWALL . . . . .	Glenfield, N. Y.
HON. GEORGE W. DRISCOLL . . . . .	Syracuse, N. Y.
HON. WILLIAM H. KELLEY . . . . .	Syracuse, N. Y.
HON. EDWARD H. O'HARA . . . . .	Syracuse, N. Y.
HON. J. HENRY WALTERS . . . . .	New York City
HON. CHARLES A. UPSON . . . . .	Lockport, N. Y.

## Officers of Board

President  
LOUIS MARSHALL

Vice-President  
JOHN R. CLANCY

## FACULTY OF THE NEW YORK STATE COLLEGE OF FORESTRY

---

CHARLES WESLEY FLINT, A.M., D.D., LL.D., PAED.D.  
*Chancellor of the University*

WILLIAM PRATT GRAHAM, PH.D.  
*Vice-Chancellor of the University*

FRANKLIN MOON, A.B., 1901 (Amherst); M.F., 1909 (Yale)  
*Dean of the College; Professor of Silviculture*

MAULSBY WILLETT BLACKMAN, A.B., 1901; A.M., 1902 (Kansas);  
PH.D., 1905 (Harvard)  
*Professor of Forest Entomology*

NELSON COURTLANDT BROWN, A.B., 1906; M.F., 1908 (Yale)  
*Professor of Forest Utilization*

JOHN WALLACE STEPHEN, A.B., 1907; M.F., 1909 (Michigan);  
M.PED., 1915 (Mich. State Normal College)  
*Professor of Silviculture*

HARRY P. BROWN, A.B., 1909; A.M., 1910; PH.D., 1914 (Cornell)  
*Professor of Wood Technology*

LAURIE D. COX, A.B., 1903 (Acadia College); S.B. IN LANDSCAPE  
ARCHITECTURE, 1908 (Harvard)  
*Professor of Landscape Engineering*

HENRY R. FRANCIS, B.S., 1910 (Massachusetts Agricultural College)  
*Professor of Forest Recreation*

LOUIS E. WISE, A.B., 1907; PH.D., 1911 (Columbia)  
*Professor of Forest Chemistry*

REUBEN PARKER PRICHARD, B.S., 1907 (Dartmouth); M.F., 1909  
(Yale)  
*Professor of Silviculture*

CLARENCE EARL LIBBY, B.S. IN CHEMICAL ENGINEERING, 1916  
(Maine)  
*Professor of Pulp and Paper Manufacture*

JAMES F. DUBUAR, A.B., 1914; M.F., 1915 (Michigan)  
*Director and Professor of Forestry, New York State Ranger School*



GURTH A. WHIPPLE

*Professor of Forest Extension*

GUSTAV H. LENTZ, Ph.B., 1915; M.F., 1910 (Yale)

*Professor of Forest Extension and Director of Forestry Summer Camp*

RICHARD R. FENSKA, B.S., 1911 (Beloit); M.F., 1913 (Yale)

*Professor of Forest Engineering*

CARLYN CHASE DELEVAN, A.B., 1914; M.S.F., 1915 (Michigan)

*Professor of Forestry at State Ranger School*

CHARLES E. JOHNSON, A.B., 1906; A.M., 1907; Ph.D., 1912 (Minnesota)

*Professor of Forest Zoology; Director of the Roosevelt Wild Life Forest Experiment Station*

PAUL D. KELLETER, A.B., 1902 (Washington Univ.); M.F., 1904 (Yale)

*Director of Forest Extension*

HENRY F. A. MEIER, A.M., (Indiana); Ph.D. (Columbia)

*Professor of Forest Botany*

WALTER W. CHIPMAN, B.S., 1893; A.M., 1904 (Wabash)

*Treasurer*

HIRAM LEROY HENDERSON, A.B., 1915 (Michigan)

*Assistant Professor of Forest Utilization*

CARL CHESWELL FORSAITH, A.B., 1913 (Dartmouth); A.M., 1914, Ph.D., 1917 (Harvard)

*Assistant Professor of Wood Technology*

HAROLD CAHILL BELYEA, A.B., 1908; A.M., 1911 (Mount Allison); B.Sc.F., 1911 (New Brunswick); M.F., 1916 (Yale)

*Assistant Professor of Forest Engineering*

ALAN F. ARNOLD (Landscape Architecture, Harvard, 1904-08)

*Assistant Professor of Landscape Engineering*

DON M. BENEDICT, B.S., 1917 (Michigan)

*Assistant Professor of Forest Botany*

RAYMOND J. HOYLE, B.S., 1917 (New York State College of Forestry)

*Assistant Professor of Forest Utilization*

ROSS ARTHUR WILLIAMS, B.S.F., 1921 (Montana); M.F., 1923 (Yale)

*Assistant Professor of Forestry at the State Ranger School*

LAURANCE LEE, A.B., 1915; M.F., 1919 (Yale)

*Registrar; Assistant Professor of English*

FRANK B. MYERS, B.S., 1913; M.F., 1914 (New York State College of Forestry)

*Assistant Professor of Forest Extension*

SVEND HEIBERG, A.B., 1921; M.Sc., 1924 (Copenhagen); M.F., 1927 (Yale)

*Assistant Professor of Silviculture*

GEORGE P. KRAMER, B.F., 1921 (Penn State Forest School)

*Assistant Professor of Timber Preservation*

RAY R. HIRT, B.S., 1917 (Hamline University); M.S., 1924; Ph.D., 1928 (New York State College of Forestry)

*Assistant Professor of Forest Botany*

WILFORD A. DENCE, B.S., 1919 (New York State College of Forestry)

*Assistant Ichthyologist Roosevelt Wild Life Forest Experiment Station*

JAMES D. KENNEDY, B.S., 1923 (Purdue)

*Assistant Professor of Forest Extension*

JUSTUS FREDERICK MUELLER, A.B., 1923 (Hopkins); A.M., 1926; Ph.D., 1928 (Illinois)

*Assistant Professor of Forest Zoölogy*

FLOYD C. PETERSON, B.S., 1924; M.S., 1925 (New York State College of Forestry)

*Instructor in Pulp and Paper Manufacture*

AUBREY H. MACANDREWS, B.S., 1925; M.S., 1926 (New York State College of Forestry)

*Instructor in Forest Entomology*

WILLIAM M. HARLOW, B.S., 1925; M.S., 1926; Ph.D., 1928 (New York State College of Forestry)

*Instructor in Wood Technology*

JOHN COGSWELL SAMMI, B.S., 1922 (California)

*Instructor in Forest Engineering*

LEROY C. STEGEMAN, B.S., (Mich. Agri. College); M.S. (U. of Mich.) 1929

*Instructor in Forest Zoölogy*

E. J. ELIASON B.S., 1923 (Purdue); M.S., 1925 (New York State College of Forestry)

*Assistant in Forest Botany*

W. CLEMENT PERCIVAL, B.S., 1923; M.S., 1926 (New York State College of Forestry)

*Assistant in Forest Botany*

REGINALD E. BALCH, B.S.A., 1923 (Ontario Agricultural College)  
*Assistant in Forest Entomology*

JOSIAH L. LOWE, B.S., 1927 (New York State College of Forestry)  
*Assistant in Forest Botany*

ALEXIS JOHN PANSHIN, B.S., 1927 (New York State College of Forestry)  
*Assistant in Wood Technology*

LUDWIG V. KLINE, B.S., 1928 (New York State College of Forestry)  
*Assistant in Wood Technology*

PHILLIP A. BRIEGLEB, B.S., 1929 (New York State College of Forestry)  
*Assistant in Forest Engineering*

RUBY W. HOWE  
*Secretary to the Dean*

ROBERT S. TRUAIR  
*Cashier*

ELEANOR CHURCH, B.L.E., 1916 (Syracuse)  
*Librarian*

MARTHA LETITIA MEELIG, B.S. in L.S., 1927 (Syracuse)  
*Reference Librarian*



## **THE NEW YORK STATE COLLEGE OF FORESTRY**

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The New York State College of Forestry at Syracuse University was created in 1911 by the legislature of the State of New York. The College is obligated to undertake such special research and state-wide investigation in forestry as will throw light upon and help in the solution of forestry problems which confront the State and the people of New York, and to serve as the State institution for educational work in forestry.

### **Location of the College and Facilities for Instruction**

In 1913 an appropriation of \$250,000 was made for a forestry building to be located on the campus of Syracuse University. The building was completed and ready for occupancy at the beginning of the second semester in the college year 1916-1917, and is one of the best and most effectively equipped buildings for forestry instruction in the United States.

The location of the New York State College of Forestry at Syracuse is particularly advantageous for carrying out the professional training of students and the state-wide educational work. From the city of Syracuse all sections of the Adirondacks and the entire central and northern regions of New York State are readily accessible by railroads, electric lines and highways. The strategic location opens a vast area to field work by the students.

The College is well equipped with apparatus for laboratory work in Forest Botany, Pathology, Dendrology, Wood Technology, Zoölogy, Entomology and Paper and Pulp manufacturing, and with instruments for field work in Forest Mensuration and Surveying.

Excellent library facilities are afforded by the special forest library maintained by the College which is rapidly being enlarged to include the most important literature in all languages covering all phases of forestry and the sciences having a bearing on forestry. Additional library facilities are furnished by the main library of Syracuse University and the Public Library of the city of Syracuse.

### **Plan and Scope of Instruction**

Undergraduate instruction comprises the following:

Lectures and field instruction in historical and economic aspects of forestry for all students of the University desiring a knowledge of the meaning of forestry.

More extended instruction along these lines to those who desire to prepare themselves to teach forestry in the public schools, in co-operation with Teachers College of Syracuse University.

The training of professional foresters for positions in the Federal and State Forest Services, or as experts for private forest work of any kind. This training provides for specialization in Forestry, Lumbering, Forest Utilization, Forest Management, Forest Chemistry, Forest Entomology, Forest Pathology and Forest Zoölogy.

A special undergraduate course in Paper and Pulp making is offered. Complete information of this course is available in a special descriptive circular which may be obtained on application to the College.

### **Provision for Graduate Work**

The continued advancement in forestry requires a firmer scientific basis. The College acknowledges its responsibility to train men to qualify themselves as competent to carry on independent investigations in the various phases of scientific forestry and in the allied sciences. Further information regarding graduate work will be found on page 18.

### **Training in the State Ranger School**

The State Ranger School gives a practical course of nine months which trains men very thoroughly for such positions as forest guard, forest ranger, tree planting expert and nursery foreman. The work is largely of a practical nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of various methods of logging and lumbering and nursery practice and tree planting. It is to be understood that this practical training is not an education in Forestry and that upon completion of the course a man will not be a trained forester. A certificate is given after completion of a year of satisfactory work in the school and a diploma following a year of satisfactory practice. A special bulletin of the Ranger School will be sent upon application to the Director, New York State Ranger School, Wanakena, N. Y.

### **Extension Activities**

Instruction and advice by means of lectures throughout the State, before high schools, granges and other organizations interested in the conservation of natural resources.

The giving of expert advice to owners of land suitable for the practice of forestry.

The publication of popular and technical bulletins and circulars embodying results of research and investigations in forestry.

Special service to producers and consumers of forest products through special market investigations and studies of closer utilization of waste material.



## Special Facilities for Field Work

The College is well equipped with facilities for the essential field work needed by all foresters. The properties available are:

### THE STATE FOREST EXPERIMENT STATION

This Station is located at 4849 South Salina St., in Syracuse, N. Y., and consists of a total area of ninety acres made up of two farms purchased and consolidated in the spring of 1912. Since 1912 experimental work has been conducted on the area. The experimental nursery operated by the College is located on this tract. A wood lot of 30 acres is also located here and is utilized for demonstration purposes.

### THE SALAMANCA FOREST EXPERIMENT STATION

This tract, acquired by purchase in 1912, consists of 1,016 acres and is located south of Salamanca in Cattaraugus County. The forest on this area is a mixed stand of hardwoods consisting of aspen, chestnut, oak and maple. Experimental thinnings have been made and several plantations established in the open portions of the tract. A plan of management has been prepared.

### THE CHITTENANGO FOREST EXPERIMENT STATION

This tract acquired by purchase in 1912 consists of 113 acres, and is located near Chittenango in Madison County. The area at one time was an experimental station of the New York Central Railroad Company.

### COLLEGE FOREST

In 1912 the Rich Lumber Company, of Wanakena, N. Y., presented to Syracuse University for use by the New York State College of Forestry for forestry purposes a tract of 1,850 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks near Wanakena, St. Lawrence County. This area is typical of the cut-over land found in northern New York and is well suited for forestry work. The College Forest is used principally by the students of the State Ranger School at Wanakena, and a forest management plan for its development has been formulated. A branch State Weather Station has been established here. An excellent opportunity for research and experimental work is afforded by the facilities found on this area.

### THE CHARLES LATHROP PACK EXPERIMENTAL FOREST

In 1923 Charles Lathrop Pack presented to Syracuse University for the use of the New York State College of Forestry, a tract of 1,000 acres, situated on Cranberry Lake, known as the "Barber" tract, and on which since 1915 the College of Forestry Camp has been held. This area serves as

a laboratory for the students and is a permanent camp where 12 weeks' practical experience in field methods is given to sophomores each summer from June 1 to August 31. Adjoining this tract are State lands included within the Adirondack Forest Preserve which are available for field demonstration.

### THE CHARLES LATHROP PACK DEMONSTRATION FOREST

In the spring of 1927 an area of 2,250 acres was presented by Charles Lathrop Pack Forestry Trust to Syracuse University for the use of the New York State College of Forestry. This Forest is in the Lake George-Warrensburg region and is located about 3 miles north of Warrensburg on the main highway between New York City and Montreal. Plans for the management of the area have been formulated to demonstrate on this area the practicability of the practice of forestry and to serve as a field laboratory for the studies of silvicultural problems.

### SHORT COURSES

Special short courses covering instruction in kiln drying, in the operation of small sawmills, wood preservation and street tree trimming, are given frequently at the College. These synoptical courses are designed primarily for men actively engaged in these respective fields of operation.

Requests for detailed information of these courses should be addressed to the Dean.

### Publications

From time to time the College issues technical publications, bulletins and circulars on various forestry subjects and problems. A list of such publications will be sent free on application. Most of the publications so listed are for free distribution, while for others a small charge is made.

The News Letter is published quarterly by the College and carries items on the work of the College, news of its Alumni and information of general interest to foresters.

The News Letter is distributed without charge.

Applications for publications should be addressed to the Director of Forest Extension, New York State College of Forestry at Syracuse University, Syracuse, N. Y.

### Communications

All general correspondence should be addressed to the Dean; inquiries and correspondence concerning entrance should be addressed to the Registrar of the New York State College of Forestry at Syracuse University, Syracuse, N. Y.

# GENERAL INFORMATION

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## Expenses

All bills *except* those for dormitory rooms and board are payable to W. W. Chipman, Treasurer, New York State College of Forestry, Treasurer's office, Forestry building. Checks should be drawn payable to W. W. Chipman, Treasurer.

Payments for dormitory rooms and board are due Syracuse University and such checks should be drawn payable to W. L. Bassett, Treasurer of Syracuse University.

## MATRICULATION

Every student on entering the University is required to pay a matriculation fee of \$5.00. This fee is not required of students passing from one college to another within the University nor of students transferring from another institution if evidence is submitted that such a fee was paid in the former institution. All students entering upon graduate work pay a matriculation fee of \$5.00.

## FEES

All fees for instruction and incidentals are payable twice a year, on or before the first day of each semester. The treasurer's receipt admits to classes.

Students who at the beginning of the college year, and for at least twelve months prior thereto, have been bona fide residents of the State of New York are exempt from payment of tuition; provided, however, that no student shall be allowed to transfer from the College of Forestry to another college in Syracuse University wherein tuition is charged without first paying \$7.00 per hour for the hours for which he may receive credit in the latter college, with the understanding that from the above amount shall be deducted whatever amount has been collected and retained by the College of Forestry for tuition and fees.

Tuition per year (Non-residents)	\$100.00
Matriculation (Paid once)	5.00
Sophomore Summer Camp (Paid once) not including board	25.00
*Library Deposit (Returnable)	5.00

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\*The Library deposit will be returned at time of graduation, or on leaving college, if personal notice is given *before* leaving.

## PER SEMESTER

General Fee, first semester . . . . .	\$ 30.00
*General Fee, second semester . . . . .	15.00
Student Activities . . . . .	2.75
Student Loan Fund and Alumni Association (Sophomore year only)	1.00
Laboratory Fees (all undergraduates) . . . . .	20.00
Laboratory Fees (graduates) . . . . .	25.00

Paper and Pulp students \$10 per semester in addition to regular fee beginning first semester sophomore year.

Diploma Fee (Paid at time of graduation) . . . . .	10.00
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## DORMITORIES

All bills are payable at the office of the Treasurer. Checks should be drawn payable to Syracuse University. In case payment is not made within two weeks of the time it is due, the student is automatically suspended.

An advance deposit of \$10.00 must be paid by each student when room is engaged or reserved, which will be credited upon the first term's bill and will be refunded in case the student does not become or remain a student in the University, provided the room is given up before September 1.

Rental for room is payable one-half at the beginning of each semester, and no refund is made unless substitute is obtained acceptable to the University. Board is payable quarterly in advance on or before September 20, November 20, February 1, April 1. If a student for good and sufficient reasons is obliged to leave the University, the portion of board unused will be refunded.

Students may re-engage rooms occupied by them for the following year provided that applications are made prior to April 1, but such rooms will not be held longer than May 15 unless contracts are signed and deposits paid by that date.

Furniture and bed linen are supplied by the University; students must supply their own towels, curtains, rugs and pictures.

Board and room in Sims Hall is \$400 a year, including heat and light. Men wishing information on Sims Hall should address Mr. Arthur E. Jenness, Sims Hall, Syracuse.

Men students not in the dormitory or chapter houses must live in houses approved by the University. A list will be sent on request from Dr. L. M. Hickernell. On arrival the student should be sure that he is in an approved house by demanding to see the "Certificate of Approval." This will avoid the necessity of moving at a later date. Students are urged to reserve rooms before September 1. For any information regarding the living conditions, address Dr. L. M. Hickernell, 17-18 Lyman Hall, Syracuse.

\*The General Fee for the second semester for students not in attendance the first semester will be \$22.50.

### SELF-SUPPORT

Many students attend Syracuse University who earn all or a part of their expenses. The earning of board and lodging is not an extremely difficult matter. At the present time, it is relatively easy for a woman student to secure board and lodging by giving four hours per day of work in a selected home near the University. Positions of this kind are more rare for men, but there are other types of work available. Only the most brilliant students, however, can expect to earn their total expenses and maintain satisfactory grades.

The Appointment Office in the Administration Building assists students in securing self-support work. Prospective students may write to the Appointment Office stating the type of work they would like to secure and stating the experience they have had in this work.

### THE CHARLES LATHROP PACK PRIZE

The Charles Lathrop Pack Foundation was established in 1923 by Mr. Charles Lathrop Pack, President of the American Tree Association; to encourage students in educational institutions in arousing public interest in forestry and to advance forestry education among the people. A prize of \$100 will be presented annually to the student of the New York State College of Forestry selected by the judges as most worthy of such recognition.

### THE BOY SCOUT SCHOLARSHIP

Through arrangements made with the National Headquarters of the Boy Scouts of America, the College awards each year a scholarship equal in value to the amount of one hundred dollars to the boy scout in the State of New York who is considered most worthy to be the recipient of this honor. Scouts who desire to become applicants for the scholarship should communicate with the Director of Education, Boy Scouts of America, 2 Park Avenue, New York; or with the Registrar of the College. Final award is made on the basis of scout and school records of the applicant.

### PHYSICAL TRAINING

Good health is necessary to attain high scholarship in college and to perform successfully the duties of later life. With this end in view considerable stress is laid upon well-regulated physical training. Every undergraduate student in the College of Forestry is required to take systematic exercise, including swimming in the gymnasium, during the first year of the course unless physically unable to engage in it.

A medical examination is given every student when he enters upon gymnasium work and his exercises are adapted to the requirements of his health and to the development of a sound body.



The athletic interests of the University are in the hands of the Athletic Association. All business is transacted through the Athletic Governing Board, which includes representatives from the faculty, alumni, students, and interested business men of the city

### REQUIREMENTS FOR ADMISSION

Students entering the regular course leading to a degree must offer 15 units of preparatory work of high school grade. A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. Two to three hours of laboratory, drawing or shop work count as equivalent to one hour of recitation. No candidate is eligible for admission to the professional courses if deficient in more than 1 count of entrance conditions. The following subjects are required for admission to the State College of Forestry:

	<i>Units</i>
English (four years) . . . . .	3
History (Ancient, Medieval, English, American, or Modern) . . . . .	1
Mathematics . . . . .	2½
(All applicants must have completed courses in elementary algebra and plane geometry; the extra unit may be made up by offering a half year's credit in Solid Geometry, Trigonometry, or Intermediate Algebra.)	
Language (Greek, Latin, French, German, or Spanish) . . . . .	2
Science . . . . .	3
Elective . . . . .	3½
(Elective units may be offered for extra courses in the subjects listed above; or in Freehand and Mechanical Drawing; Carpenter Shop or Foundry; Economics; Agriculture. Credit cannot be granted for purely commercial subjects like stenography or typewriting, commercial arithmetic, or business writing.)	
Total . . . . .	15

The College in maintaining a high standard of work believes that satisfactory college work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of forestry and that there is no short cut to the profession. The College urges every young man who is considering the study of forestry to make up his mind to spend all the time necessary for thorough preparation for college work.

Freshmen are accepted *only* at the beginning of the fall semester. There is no opportunity to enter at midyear except on advanced standing from some other college.



## **UNDERGRADUATE WORK IN THE COLLEGE OF FORESTRY**

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### **I. The Four Year Course in General Forestry Leading to the Degree of Bachelor of Science**

This is essentially a general college course in which the student studies forestry as his major subject. He should realize that it must necessarily fall short of the measure of special training necessary for the professional forestry degree. It is designed for students who desire a somewhat intimate knowledge of various branches of forestry for the general satisfaction which such knowledge gives, or for the use they can make of it in a practical way; for those who wish to prepare themselves to teach certain aspects of forestry in the public schools; or for those who after their college course wish to take subordinate positions in lumbering or manufacturing of forest products or subordinate positions in state or national forest service. Such students will not be entitled to the designation of professional foresters merely upon the completion of the four years' course.

### **II. The Four Year Course in Pulp and Paper Manufacture Leading to the Degree of Bachelor of Science**

This course has been established to fill the increasing demand for technical men in the important field of utilization included by the pulp and paper industry. The curriculum of the first year is identical with the general forestry course giving the student the opportunity of determining his future work at the College. The last three years of the course are largely devoted to chemistry, physics, engineering and the technical phases of pulp and paper manufacture. Upon satisfactory completion of the four year program the student should be qualified to enter the pulp and paper industry as a mill control chemist, a technologist in forest products or an operating mill executive.

### **III. The Four Year Course in Landscape and City Forestry Leading to the Degree of Bachelor of Science**

The object of the course is to train men for certain specialized lines of public service which deal with the growing of trees for their aesthetic value, just as the growing of trees for their commercial value is the problem of technical forestry.

The course aims primarily to supply the constantly increasing demand of cities and towns for men with the expert arboricultural knowledge of the forester and the artistic appreciation of the landscape architect, to

care for the trees on their streets, parkways and boulevards and in their parks and reservations. Upon graduation, students should be qualified to act as assistants to city foresters, park superintendents or landscape engineers or to act as construction or planting foremen upon any form of landscape or park work or as draftsmen or designers in landscape, park or city planning organizations.

The care and control of street and park trees is very closely related to park administration and the College aims to make the training so broad that men are prepared for activity in either field.

#### **IV. The Five Year Professional Course Leading to the Degree of Master of Forestry**

This course is designed to prepare professional foresters for higher positions of responsibility in the state service, the national forest service and for the position of expert forester for private concerns. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man must of necessity build his professional training upon a foundation of general culture. It is the unanimous opinion of the leaders in forestry education and in the development of forestry policy in this country, that men who expect to follow the profession of forestry act unwisely if they try to make a short cut by eliminating the foundation training. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting the full measure of time advised for preparation. It is advised that every man who takes the four year undergraduate course in the College will go on and complete his fifth year either immediately following the fourth year or after a year or two of practical work.

The fifth year of this five year course is in reality graduate work and subject to the rules governing graduate work in the College of Forestry.

#### **V. Graduate Work**

Graduate work in the College has been planned with the purpose of training two different types of men—first, the man with a more complete, broad, general training in forestry and, second, the specialist, capable of investigating special economic and scientific problems of forestry. The broad, general training is designed to train men as administrators of state, national or private forest or parks. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting at least five years of study and preparation. For this reason it is strongly urged that students who have shown proper ability in the four year course in the College return and complete a fifth year either immediately following the fourth year or after a year or two of practical work. This five year course leads to the degree of Master of Forestry.

There are a vast number of technical and scientific problems which must be investigated before forestry really comes into its own in this country and such problems can be solved only by the man who has been specially trained in methods of investigation and who is thoroughly conversant with the research in his own field. The College of Forestry is offering graduate work in all phases of scientific forestry such as silviculture, wood technology, forest pathology, forest entomology, forest zoölogy, forest chemistry, etc

The graduate work is open not only to graduates of forestry courses but under certain restrictions, mentioned in another place, to men whose undergraduate work has been along other scientific lines. Two degrees are open to men taking such work: Master of Science and Doctor of Philosophy.

## **Rules Governing Graduate Work in the College of Forestry**

### **DEGREES OFFERED**

The following degrees will be conferred upon the satisfactory completion of approved schedules of courses and of the other requirements:

Master of Forestry, Master of City Forestry, Master of Science and Doctor of Philosophy.

It should be understood that the time requirements mentioned below are minimum requirements only. The College does not obligate itself to grant degrees, except upon the completion of all the work in a manner satisfactory to its faculty. The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.

### **MAJORS AND MINORS**

At the time of enrolling, the candidate for a degree shall submit a schedule consisting of not more than 15 semester hours in each semester. This schedule shall be distributed between a major of nine semester hours and two minors of three semester hours each. If so desired, both the major and one minor may be taken in one department or both minors may be taken in one department. This schedule must receive the approval of the graduate committee and the Dean.

### **REQUIREMENTS FOR THE DEGREE OF MASTER OF FORESTRY**

For the successful prosecution of the work the ability to read German at sight is necessary.

For candidates who are graduates of approved courses in technical forestry a minimum of one year of residence work is required. For graduates in other courses a minimum of two years' residence work will be necessary.

A thesis or report showing the candidate's ability to complete satisfactorily an investigation upon a topic connected with the candidate's major study must be submitted to the professor in charge not later than May 1st of the year in which the candidate receives his degree. This, if approved by the professor in charge, and if acceptable to the graduate committee is so endorsed and a copy is deposited in the library.

Upon the acceptance of his thesis the candidate will be notified and provided he has satisfactorily passed written examinations in all his courses he will at the same time be instructed when to appear for an oral examination. This examination will be given by the professors under whom the candidate's work has been taken—the Dean or some member of the graduate committee acting as chairman. Any member of the faculty is privileged to be present. This examination will not take place later than June 1st.

#### REQUIREMENTS FOR THE DEGREE OF MASTER OF CITY FORESTRY

A reading knowledge of French is desirable.

For students who are graduates in the course of City Forestry in this College or who have had equivalent courses, a minimum of one complete year of residence work of acceptable grade along approved lines is required.

Similar requirements with regard to thesis and oral examinations as for the Master of Forestry degree are in force.

#### REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

For the successful completion of the work, the ability to read German at sight is necessary.

For students who are graduates in forestry of this institution or others of a similar grade, a minimum of one year of residence work of an acceptable grade is desired.

Students who are graduates in lines other than forestry may be recommended for their degree on the completion of one year of satisfactory residence work provided he has taken at least one minor in forestry. *The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.*

Similar requirements are made as regards thesis and oral examinations as for the preceding two degrees.

REQUIREMENTS FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY

A candidate must be a graduate of a college of approved standing and his undergraduate standing must have been such as to fit him to pursue advanced work in the subject which he chooses as his major. Before beginning the second year of graduate work the candidate must demonstrate his ability to read scientific German and French at sight.

In case the candidate holds merely the bachelor's degree a minimum of three years' graduate work is required. One year's residence in graduate work at another college may be substituted with the approval of the Dean and graduate committee.

At the time of enrolling, the candidate must choose the major study and two minor studies subject to the same rules as those governing other graduate work. If the candidate is not a graduate in forestry at least one of these minors during two years of his course must be in forestry.

A thesis demonstrating the results of scientific research upon a topic bearing upon his major subject must be completed and receive the approval of the major professor not later than May 1st of the year in which the degree is granted. This must be satisfactory to the Dean and graduate committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the College library.

The candidate is required to pass two examinations, both oral. The preliminary examination will be upon the subjects covered by his major and minors. The final examination will be upon the candidate's thesis.

## GROUP ELECTIVE SYSTEM—

In September, 1924, a new system of election known as the *Group Elective System* went into effect. By this system the student will, at the proper place in his course, elect his work in one of the following eight groups:

- I. Silviculture and Management.
- II. Forest Protection.
- III. Recreational Forestry.
- IV. Forest Utilization.
- V. Forest Zoölogy.
- VI. Wood Technology—Chemistry.
- VII. Landscape Engineering.
- VIII. Pulp and Paper Manufacture.

The students electing the Pulp and Paper course will take the freshman year as prescribed and start this special work at the beginning of the sophomore year—taking the program of subjects as prescribed in Group VI.



All other students of the college will complete the freshman and sophomore years and the Sophomore Summer Camp. With the beginning of the junior year they will elect one of the five remaining groups.

Students electing Groups I or II and all students in other groups who have elected the course in Silviculture IV and Engineering XI are required to attend the Senior Camp. This will be in session during the month of May of the senior year and will be devoted to field work in Silviculture and Management.

### Program of Courses

#### FRESHMAN YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Chemistry 1	4	Chemistry 1	4
Botany 1	3	Botany 2	3
English 1	2	English 1	2
Modern Language	3	Modern Language	3
Mathematics 1	3	Engineering 1	3
Landscape Engineering 1	2	Landscape Engineering 1	2
	<hr/> 17		<hr/> 17

#### SOPHOMORE YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Botany 3	3	Botany 4	3
English 2	2	English 2	2
Zoölogy 1	3	Entomology 1	3
Engineering 2	3	Engineering 3	3
*Physics 5	3	*Physics 5	3
Wood Technology 1	4	Wood Technology 1	4
	<hr/> 18		<hr/> 18

*\*Students who propose to take the Landscape Engineering course will take Architecture instead of Physics.*

SOPHOMORE SUMMER CAMP ON CRANBERRY LAKE IN THE ADIRONDACKS, 10 weeks beginning June 15. Required of all students in Forestry. Prerequisites: Engineering 1, 2, and 3. Instruction by members of the various departments. No junior who has not had the prescribed engineering at the summer camp will be permitted to take Engineering 14. All men attending the camp are required to be able to swim.

### GROUP I—SILVICULTURE AND MANAGEMENT GROUP

#### JUNIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
English 3	2	Engineering 14	3
Entomology 2	3	Gen. Forestry 1	3
Geology 1	3	Gen. Forestry 10	2
Silviculture 1	3	Silviculture 3	3
Utilization 1	3	Soils 1	3
Wood Technology 3	3	Utilization 2	3
	<hr/> 17		<hr/> 17



## SENIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Botany 12	3	Engineering 4	3
Business Law 1	2	Gen. Forestry 5	2
Economics 1	3	Silviculture 4	3
Engineering 16	3	Speech 14	2
Gen. Forestry 14	2	Utilization 4	3
Silviculture 11	3	Utilization 19	2
Elective or not	2-0	Elective or not	3-0
	<hr/> 18-16		<hr/> 18-15

## FIFTH YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Engineering 11	3	Engineering 12	3
Engineering 15	3	Engineering 21	
Engineering 21		or Silviculture 21	3
or Silviculture 21	3	Silviculture 12	3
Utilization 12	3	Silviculture 14	3
Wood Technology 13	2	Utilization 16	3
Elective or thesis	3	Wood Technology 13	1
	<hr/> 17	Elective or thesis	3
			<hr/> 19

## GROUP II—FOREST PROTECTION GROUP

## JUNIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
English 3	2	Botany 11	
Entomology 2	3	or Entomology 12	3
Geology 1	3	Engineering 14	3
Silviculture 1	3	Gen. Forestry 1	3
Utilization 1	3	Silviculture 3	3
Wood Technology 3	3	Soils 1	3
	<hr/> 17	Group Requirement	2-3
			<hr/> 17-18

## SENIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Botany 12	3	Botany 15	
Business Law 1	2	or Entomology 16	3
Economics 1	3	Chemistry 2	
Entomology 17		or Entomology 16	3
or Chemistry 2	3	Silviculture 4	3
Gen. Forestry 14		Speech 14	2
or Utilization 17	2-3	Group Requirement	4-6
Silviculture 11	3		
	<hr/> 16-17		<hr/> 15-17

*Graduate work to be arranged in consultation between the head of the department, chairman of the Graduate Committee, and the student.*

## GROUP III—RECREATIONAL FORESTRY GROUP\*

## JUNIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
English 3	2	Engineering 14	3
Geology 1	3	Landscape Engineering 2	4
Landscape Engineering 2	4	Recreation 1	3
Recreation 1	3	Recreation 4	2
Silviculture 1	3	Silviculture 3	3
Utilization 1	3	Soils 1	3
	<u>18</u>		<u>18</u>

## SENIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Business Law 1	2	Gen. Forestry 1	3
Economics 1	3	Landscape Engineering 3	4
Engineering 16	3	Physiography	3
Landscape Engineering 3	4	Silviculture 4	3
Physiography	3	Speech 14	2
Recreation 3	3	Zoölogy 2	3
	<u>18</u>		<u>18</u>

*\*Students in Recreational Forestry are not required to attend Senior Camp.*

## FIFTH YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Engineering 11	3	Economics 131	3
Gen. Forestry 14	2	Engineering 12	3
Recreation 15	3	Gen. Forestry 10	2
Silviculture 11	3	Recreation 16	3
Silviculture 14	3	Zoölogy 14	3
Thesis	4	Thesis	4
	<u>18</u>		<u>18</u>

## GROUP IV—FOREST UTILIZATION GROUP\*

## JUNIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Accounting 21	3	Economics 1	3
Economics 1	3	Gen. Forestry 1	3
English 3	2	Silviculture 3	3
Silviculture 1	3	Utilization 2	3
Utilization 1	3	Utilization 4	3
Wood Technology 3	3	Group Requirement	3
	<u>17</u>		<u>18</u>

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Botany 12		Engineering 14	3
or Silviculture 11	3	Silviculture 4	2
Business Law 1	2	Speech 14	2
Gen. Forestry 14	2	Utilization 16	3
Transportation 1	3	Utilization 18	3
Utilization 6	1	Utilization 19	2
Utilization 14	3	Group Requirement	3
Utilization 17	3		
	17		18

*\*Utilization trip during May instead of Senior Camp required for graduation.*

## FIFTH YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Engineering 16	3	Utilization 13	2
Utilization 11	2	Utilization 15	3
Utilization 12	3	Utilization 21	3
Utilization 21	3	Wood Technology 13	1
Wood Technology 13	2	Group Requirement	9
Group Requirement	3		
	16		18

## GROUP V—FOREST ZOOLOGY GROUP\*\*

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
English 3	2	Recreation 1	3
Geology 1	3	Silviculture 4	2
Recreation 1	3	Soils 1	3
Silviculture 1	3	Zoölogy 2	3
Zoölogy 5	3	Zoölogy 7 (For)	3
*Zoölogy 7 (L.A.)	4	*Zoölogy 104 (L.A.)	3
	18		17

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Business Law 1	2	Geology 119	3
Economics 1	3	Philosophy 1	3
Entomology 2	3	Speech 14	2
Geology 106	3	Zoölogy 6	3
Philosophy 1	3	*Zoölogy 12	4
Zoölogy 3	3	Zoölogy 14	3
	17		18

*\*Courses given in Lyman Hall, College of Liberal Arts.*

*\*\*Senior Camp not required of students in this group.*

*Graduate work to be arranged in consultation between the head of the department, chairman of the Graduate Committee, and the student.*

## GROUP VI—WOOD TECHNOLOGY—CHEMISTRY GROUP\*\*

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Chemistry 2	3	*Botany 25 (L.A.)	3
Economics 1	3	*Botany 113 (L.A.)	3
English 3	2	Chemistry 2	3
Geology 1	3	Mathematics 3	3
Silviculture 1	3	Soils 1	3
Wood Technology 3	3	Wood Technology 12	3
	17		18

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Business Law 1	2	Business Math. 5	3
Chemistry 11	3	Chemistry 20	3
Chemistry 20	3	Chemistry 130	3
Chemistry 130	3	Mathematics 105	3
Mathematics 104	3	Speech	2
Utilization 1	3	Wood Technology 13	1
Wood Technology 13	2	Physics or Mechanics	3
	19		18

\*College of Liberal Arts Courses, given in Lyman Hall.

\*\*Senior Camp not required for students in this group.

Graduate work to be arranged in consultation between the head of the department, chairman of the Graduate Committee, and the student.

## GROUP VII—LANDSCAPE ENGINEERING GROUP\*

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Arboriculture 1	3	Arboriculture 1	3
Architecture 2	2	Architecture 2	2
Entomology 3	3	Entomology 3	2
Graphics 41	3	Freehand Drawing 31	2
Landscape Engineering 2	4	Geology 16	3
Silviculture 1	3	Landscape Engineering 2	4
		Silviculture 4	2
	18		18

\*Senior Camp not required of students in this group.

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Business Law 1	2	Arboriculture 3	3
Economics 1	3	Freehand Drawing 32	2
Graphics 43	2	Landscape Engineering 3	5
Landscape Engineering 3	5	Landscape Engineering 4	4
Landscape Engineering 4	4	Landscape Engineering 6	2
Landscape Engineering 5	2	Speech 14	2
	18		18

## FIFTH YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Architecture 1	1	Architecture 18	2
Architecture 24	2	Architecture 23	2
Architecture 27	2	Engineering 14	3
Botany 12	3	Landscape Engineering 21	3
Geology 106	3	Landscape Engineering 22	6
Landscape Engineering 22	6	Thesis	3
Landscape Engineering 23	2		
	19		19

## GROUP VIII—PULP AND PAPER MANUFACTURE

*Freshman Year as Prescribed*

## SOPHOMORE YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Chemistry 20, Qualitative	3	Chemistry 20, Qualitative	3
Physics 1	4	Physics 1	4
English 3	3	Economics 1	3
Math. 2 Analytics	3	Math. 3, Analytics	3
Drawing 1	1	Mechanical Drawing 3	2
Mechanical Drawing 2	1	Wood Technology 1	4
Wood Technology 1	4		
	19		19

*Three Months' Summer Work in a Pulp or Paper Mill*

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Chemistry 130, Quantitative	3	Chemistry 130, Quantitative	3
Forestry Chemistry 2, Organic	3	Forest Chemistry 2, Organic	3
Speech 15, Public Speaking	3	Math. 4, Calculus	3
Pulp and Paper Manufacturing:		Pulp and Paper Manufacturing:	
1—Technology	3	1—Technology	3
2—Laboratory	2	2—Laboratory	2
3—Machinery	3	3—Machinery	2
4—Mill Analyses	2	4—Mill Analyses	1
		5—Paper Testing	2
	19		19

*Three Months' Work in a Pulp or Paper Mill*

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Wood Technology 3	3	Wood Technology 5—Fibres	3
Business Law 1	2	Mechanical Laboratory 3	2
Heat and Power 1	3	Electrical Machinery 6	3
Electrical Machinery 5	3	Electrical Laboratory 6	2
Electrical Laboratory 5	2	Pulp and Paper Mfg.—8 Organization	1
Pulp and Paper Mfg.—9 Problem	1	Pulp and Paper Mfg.—10 Problem	3
Pulp and Paper Mfg. 7—Coloring	2		
Forest Chemistry 11—Cellulose	3		
	19		14

## Description of Courses in the College of Forestry

Note—A numeral following the title of the course indicates the number of credit hours a week. A credit hour means one recitation (or lecture) hour per week. Three laboratory hours are equivalent to one credit hour. All courses extend through the year unless followed by a Roman numeral, which limits the subject to the semester named.

### Department of Forest Botany

PROFESSOR PENNINGTON; ASSISTANT PROFESSOR BENEDICT

INSTRUCTOR HIRT; ASSISTANTS PERCIVAL AND ELIASON

*Courses 1, 2, 3 required of undergraduates.*

*Courses 6, 11, 12, 13, 14 elective for graduates or undergraduates.*

*Course 21 for graduates only.*

Students who wish to take special work in Forest Pathology should elect Course 11, the first semester of the junior year.

1. FOREST BOTANY. 3. Required, freshman. Two hours' lecture. Three hours' laboratory. An elementary course throughout the first year dealing with structure and functions of plants and the fundamental problems of Botany, together with a general survey of the plant kingdom.—I. Messrs. Pennington, Benedict, Hirt, Percival and Eliason.

2. FOREST BOTANY. 3. Required, freshman. A continuation of Forest Botany 1.—II. Messrs. Pennington, Benedict, Hirt, Percival and Eliason.

3. PLANT PHYSIOLOGY. 3. Required, sophomore. Lectures, recitations, and laboratory. A course designed to teach the fundamental physiological processes involved in growth of plants.—I or II. Mr. Benedict. Prerequisites: Courses 1 and 2.

4. SYSTEMATIC BOTANY. 3. Required, sophomore. Lectures, recitations, laboratory and field-work. A course designed to teach the fundamentals of plant classification and identification.—II. Mr. Benedict. Prerequisites: Courses 1 and 2.

11. GENERAL MYCOLOGY. 3. Elective. One hour lecture. Four to six hours' laboratory. A course in the structure and life histories of fungi.—I. Mr. Benedict. Prerequisites: Courses 1, 2 and 3.

12. FOREST PATHOLOGY. 3. Elective, Junior. Two hours' lecture. Three hours' laboratory. A course of lectures and laboratory work upon the diseases of plants in general with especial emphasis upon diseases of trees.—I. Messrs. Pennington and Benedict. Prerequisites: Courses 1, 2 and 3.

13. CULTURE METHODS. 3. Elective. Six hours' laboratory and conference. A study of technique in the isolation and pure culture of fungi.—II. Mr. Benedict. Prerequisites: Courses 6 and 8.



14. **ADVANCED MYCOLOGY.** 3. Elective. A year course in the classification of fungi.—I and II. Mr. Pennington, Prerequisites: Courses 6 and 11.

15. **ADVANCED FOREST PATHOLOGY.** 3. Elective. One hour lecture. Six hours' laboratory.—I and II. Mr. Pennington. Prerequisites: Courses 6 and 7.

21. **RESEARCH IN FOREST BOTANY AND PATHOLOGY.** Elective for graduates.—I and II. Messrs. Bray and Pennington.

## Department of Forest Chemistry

PROFESSORS WISE AND LIBBY; INSTRUCTOR PETERSON

*Courses in Forest Chemistry 2 and 11 are required of all students in Groups IV and VII. They are open to properly qualified students in Forestry. All courses in paper and pulp manufacture are required of students entering this field. Forest Chemistry 12 and 21 are open only to properly qualified graduate students.*

### Forest Chemistry

1. **GENERAL INORGANIC CHEMISTRY.** 4. Required of all freshmen. Given in the department of Chemistry of the College of Liberal Arts.—I and II. Mr. Jordy, Mr. Baker and Instructors.

2. **ORGANIC CHEMISTRY.** 3. P. and P. junior required. Two hours' lecture and 3 hours' laboratory. This is primarily an elementary course in organic chemistry.—I and II. Mr. Wise. Prerequisite: Chemistry 1.

11. **CHEMISTRY OF CELLULOSE.** 3. P. and P. senior required. Three hours' lecture. An elementary course in the chemical and physical properties and the use of cellulose and its derivatives.—I. Mr. Wise. Prerequisite: Forest Chemistry 2.

12. **CHEMISTRY OF CELLULOSE.** 2. Graduate elective. Two hours' lecture (or seminar). Lecture will cover researches on the constitution, properties, and uses of cellulose and its derivatives. This is essentially a graduate course.—II. Mr. Wise. Prerequisites: General Chemistry, Qualitative and Quantitative Analysis, Organic Chemistry, and a reading knowledge of German.

13. **SEMINAR.** 1. Elective. One hour weekly. Reports on the recent chemical literature dealing with forest products.—I and II. Mr. Wise. Prerequisite: Chemistry 3 or its equivalent.

21. **RESEARCH IN FOREST CHEMISTRY.** Graduate elective. Hours to be arranged. Problems in forest chemistry and organic chemistry will be assigned to properly qualified graduate students.—I and II. Mr. Wise. Prerequisites depend upon the nature of the problem.

## Pulp and Paper Manufacture

*Special bulletin describing the work of the paper and pulp course should be obtained by writing for it to the Registrar of the College. This course is subject to revision from year to year.*

1. TECHNOLOGY. 3. P. and P. junior required. Three hours' lecture. Study of the processes employed in the manufacture of pulp and paper.—I and II. Mr. Libby. Prerequisites or parallel courses: Chemistry 20 and 130.

2. TECHNOLOGY LABORATORY. 2. P. and P. junior required. Six hours' laboratory. Laboratory demonstrations of the principles of pulp and paper manufacture described in Course 1.—I and II. Mr. Peterson. Prerequisite or parallel courses Pulp and Paper 1 and 3.

3. MACHINERY. 3. First semester and 2. second semester. P. and P. junior required. Three hours' lecture. Lectures on the design, construction and operation of machinery used in the pulp and paper industry.—I and II. Mr. Peterson. Prerequisite or parallel courses: Physics 1 and P. and P. 1.

4. MILL ANALYSES. 3. P. and P. junior required. Six hours' laboratory. Evaluation of materials used in the manufacture of pulp and paper.—I and II. Mr. Libby. Prerequisite or parallel courses: Chemistry 20 and 130 and P. and P.

5. PAPER TESTING. 2. P. and P. junior required. Six hours' laboratory. Physical, chemical and microscopical characteristics of papers.—II. Mr. Libby. Prerequisites or parallel courses: P. and P. 4.

7. COLORING. 2. P. and P. senior required. Six hours' laboratory. Evaluation and identification of dyestuffs and the development of color formulas for dyeing pulp and paper.—I. Mr. Libby. Prerequisites or parallel courses: P. and P. 4.

9. PROBLEM. 1. P. and P. senior required. A report covering a systematic survey of all available literature on some problem of interest to the pulp and paper industry. —I. Messrs. Wise, Libby and Peterson. Prerequisites or parallel courses: Pulp and Paper Mfg. 1 to 5. Forest Chem. 2 and 11 and Chem. 20 and 130.

10. PROBLEM. 5. P. and P. senior required. Laboratory development of the problem formulated in course 9.—II. Messrs. Wise, Libby and Peterson. Prerequisite: Pulp and Paper Mfg. 9.

## General Forestry

*Courses 1 and 5 are required of all undergraduates.*

*Course 10 is required of seniors in Group I*

*Course 14 is elective for seniors.*

1. HISTORY OF FORESTRY. 3. Three hours' lecture. The development of forestry as influenced by the great epochs in world history with especial reference to Germany, France and the United States. Lectures, recitations and reports.—II. Mr. Lee.

5. FOREST SEMINAR. 2. Required. Assignment and discussion of current forestry subjects.—II. Mr. Fenska.

10. FOREST LAWS AND POLICIES. 2. Required for seniors in the Silviculture and Management group. Two hours' lecture. The object of this course is to gain knowledge of the important laws affecting the National Forests and Public Domain. The forest laws of the principal states engaged in forestry work will be studied in detail. Forest taxation, legislation, administration and state and national policies will be discussed.—I. Mr. Hoyle.

14. NATIONAL FOREST PRACTICE. 2. Elective for seniors. Two hours' lecture. The creation and organization of United States Forest Service; with particular reference to the protection, administration and development of the National Forests. Lectures and reports.—I. Mr. Kelleter.

## Department of Forest Engineering

PROFESSOR FENSKA; ASSISTANT PROFESSOR BELYEA;  
INSTRUCTOR SAMMI

*Courses 1, 2, 3, are required of all undergraduates.*

*Summer Camp Engineering is also required.*

*Courses 11 and 12 are elective to graduates and undergraduates.*

*Courses 21 and 22 are elective to graduates only.*

1. PLANE SURVEYING. 3. Required sophomore. Two hours' lecture. Three hours' field work. A preliminary course in the use of surveying instruments and field methods. Mapping and office computations. II. Messrs. Fenska and Sammi. Prerequisite for Sophomore Summer Camp.

2. PLANE SURVEYING. 3. Required sophomore. Two hours' lecture. Three hours' field work. Continuation of Engineering 1. I. Messrs. Fenska and Sammi. Prerequisite for the Sophomore Summer Camp. Prerequisite: Engineering I.

3. FOREST MENSURATION. 3. Required sophomore. Three hours' lecture. A study of the measurements of volume of logs, trees and forest; estimating and mapping of timber, compilation of volume tables and collection of data in a detailed study of a forest area by stem analysis for purpose of predicting future possibilities. II. Messrs. Fenska, Belyea, Sammi and Assistants.

4. **FOREST FINANCE.** 3. Three hours' lecture. The business aspects of forest management and the principles of economics and finance underlying the administration of forest properties.—II. Mr. Belyea.

11. **FOREST REGULATION.** 3. Three hours' lecture. Organization of forests for management. The normal and empirical forest, rotation and methods of regulating the cut.—I. Mr. Belyea.

12. **ENGINEERING.** 3. Applied Forest Management. The application of management to specific forests and areas as demonstrated by actual practice in the United States.—II. Mr. Belyea.

14. **TOPOGRAPHIC SURVEYING.** 3. One hour lecture. Six hours' field work. Methods of topographic mapping, by aneroid and pacing, transit and stadia, abney level and slope chain, plane table with telescopic alidade and trigonometric leveling.—I. Messrs. Fenska and Sammi. Prerequisite: Summer Camp Engineering.

15. **FOREST INCREMENT.** 3. Two hours' lecture, one laboratory period. A continuation of Forest Mensuration as applied to the principles of determining increment and yields.—I. Mr. Belyea.

16. **FOREST ENGINEERING.** 3. Seniors. Two hours' lecture, three hours' field work. The application of engineering principles in the construction of trails, roads, bridges, logging railroads, chutes, flumes, dams, telephone lines, fire towers, cabins, etc., for the development and proper utilization of a forest.—II. Mr. Fenska.

21. **ADVANCED FOREST MANAGEMENT.** Elective for graduate students only. Individual study of an assigned problem in Forest Management. Hours to be arranged.—I and II. Mr. Belyea.

22. **ENGINEERING.** 3. Advanced Forest Regulation. Elective to graduates only. Actual problems in regulation of the cut will be given the student with seminar consultation and outside reading.—II. Mr. Belyea.

## Department of Landscape Engineering

PROFESSOR COX; ASSISTANT PROFESSOR ARNOLD

### Arboriculture

*Course 1 is required of juniors.*

*Course 3 is required of seniors.*

*Courses 2 and 4 are elective for undergraduates.*

1. **PLANT MATERIALS.** 3. Junior required. Lectures, field trips and preparation of planting plans. This course covers deciduous and evergreen shrubs, vines and perennials.—I and II. Mr. Arnold.

2. **PRUNING AND CARE OF TREES.** 3. Elective. Two hours' lecture. Two hours' laboratory.—II. Mr. Cox.

3. **SHADE AND ORNAMENTAL TREES.** 3. Senior required. Three hours' lecture. Deciduous and evergreen trees used for shade or ornamental purposes—their identification and use.—II. Mr. Cox. Prerequisite: Arboriculture 1.

## Landscape Engineering

*Course 0 is for students in other colleges; not Forestry.*

*Course 1 required of all freshmen.*

*Course 2 is required of juniors in Landscape Engineering.*

*Courses 3, 4 and 5 are required of seniors in Landscape Engineering.*

*Courses 21 and 22 are for graduates or specially qualified students.*

0. THE APPRECIATION OF LANDSCAPE ARCHITECTURE. 3. Not open to students of the College of Forestry but to other students of the University. Three hours' lecture. The elements and principles of Landscape Design. Lectures and reports.—II. Messrs. Cox and Arnold.

1. DRAFTING AND LETTERING. 1. Required for all members of the freshman class. Two hours' laboratory with additional hours drafting.—I and II. Mr. Cox.

2. LANDSCAPE DESIGN. 4. Six hours' drafting, two hours' lecture, junior. Elements and principles of Landscape Engineering.—I and II. Messrs. Cox and Arnold.

3. LANDSCAPE DESIGN. 4. Twelve hours' drafting, with occasional lectures, senior. Elementary designs in Landscape Engineering.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 2.

4. LANDSCAPE ENGINEERING CONSTRUCTION. 3. Senior. Two hours' lecture. Three hours' drafting. Highway design and construction, grading and drainage plans, and details of landscape construction.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 2.

5. CITY PLANNING. 3. Senior. Two hours' lecture. One hour reports and assigned reading. The economic, aesthetic and engineering principles of modern City planning.—I. Mr. Cox.

6. LANDSCAPE SEMINAR AND THESIS. 3. Assignment and discussion of important problems. Senior.—II. Mr. Cox.

21. LANDSCAPE ENGINEERING DETAILS. 2. Elective. One hour lecture. Three hours' drafting. Design of construction used in Landscape Engineering.—I or II. Messrs. Cox and Arnold. Prerequisite: Landscape Engineering 2 and 3.

22. LANDSCAPE ENGINEERING DESIGN. Elective. Advanced landscape engineering design for fifth year students.—I and II. Messrs. Cox and Arnold.

23. ADVANCED CITY PLANNING. 2. Graduate course. Special problems in park and city aesthetics. I. Messrs. Cox and Arnold.



## Department of English

ASSISTANT PROFESSOR LEE

*Course 1 is required of all freshmen.*

*Course 2 is required of sophomores in Groups I-VI.*

*Course 3 is required of sophomores in Group VII; juniors in Group I-V.*

1. ELEMENTS OF COMPOSITION. 2. Two hours' recitation. An intensive drill in the principles of prose composition together with a study of selected English masterpieces. I and II. Mr. Lee and Assistant.

2. LITERATURE. 2. Two hours' recitation. A detailed study of the longer forms of composition together with a brief survey of English literature. I and II. Mr. Lee and Assistant.

3. TECHNICAL EXPOSITION. 2. Two hours' recitation. A study of English as applied in the writing of reports, and technical and professional papers. I. Mr. Lee.

## Department of Forest Entomology

PROFESSOR BLACKMAN; INSTRUCTOR MACANDREWS; ASSISTANTS BALCH AND MACALONEY

*Course 1 is required of all undergraduates in Forestry.*

*Courses 2 and 3 required in certain groups.*

*Courses 11, 12, 13, 14, 15, 16, and 17 may be taken either as elective undergraduate work or as minors in the graduate courses.*

*Course 21 can be taken only as major graduate work.*

1. ELEMENTARY ENTOMOLOGY. 3. Required, Sophomore. Two hours' recitation. Three hours' laboratory. A general course devoted to the study of morphology, life histories and general classification of insects.—II. Messrs. Blackman, MacAndrews, Balch and MacAloney. Forest Zoölogy 1 is prerequisite for this course.

2. FOREST ENTOMOLOGY. 3. Elective. Two hours' lecture. Three hours' laboratory. Devoted to a study of insects of economic importance in Forestry.—I. Messrs. Blackman, MacAndrews and Balch. Course 1 is prerequisite.

3. INSECTS AFFECTING SHADE TREES AND ORNAMENTAL SHRUBS. 5. Required, Junior Landscape Engineering. First semester. Two hours' lecture. Three hours' laboratory. Second semester 1 hour lecture, 3 hours' laboratory. Intended primarily for students specializing in City Forestry.—I and II. Mr. MacAndrews. Course 1 prerequisite.

11. ELEMENTARY INSECT TAXONOMY. 3. Elective.—I or II. Mr. Blackman. Courses 1 and 2 are prerequisite.

12. INSECT ANATOMY. Elective. A more detailed study of the anatomy of certain insects not studied in previous courses. Messrs. Blackman and MacAndrews.



13. INSECT TAXONOMY. Elective. A more detailed study of classification of some particular group of insects. Mr. Blackman.

14. INSECT HISTOLOGY. Elective. A study of the tissues and microscopic anatomy of insects and the methods used in the preparation of insect material for microscopic study. Mr. Blackman.

15. PROBLEMS IN FOREST ENTOMOLOGY. Elective. Individual study of small problems in forest entomology.—I or II. Messrs. Blackman and MacAndrews.

16. SEMINAR. 2. Elective. Library investigation, reports and discussion of forest insects of great economic importance. Two hours' conference per week. By appointment—I or II. Mr. Blackman.

17. INSECT ECOLOGY. 3. Elective. Two hours' lecture. Three hours' laboratory or field. A study of the various interacting environmental or habitat factors which influence the relative abundance and distribution of insects; and the practical application of ecological principles to problems in forest entomology. By appointment.—I or II. Mr. MacAndrews.

21. RESEARCH PROBLEMS IN FOREST ENTOMOLOGY. Elective. For graduate students.—I and II. Mr. Blackman.

## Department of Recreational Forestry

PROFESSOR FRANCIS

*Courses 1 and 2 are required of all undergraduates in Recreation.*

*Courses 3 and 4 are required of seniors in Recreation.*

*Courses 2 and 3 are elective for graduates.*

*Courses 15 and 16 are elective for graduates or undergraduates.*

*Course 21 is for graduates only.*

1. RECREATIONAL USES OF FOREST AREAS. 3. Required of juniors. Two hours' lecture. Three hours in field or in assignments. A general course to teach the fundamental principles of the public use of forest areas for recreation and the relation of recreation to other forest uses.—I and II.

2. DEVELOPMENT OF FOREST PARK RECREATIONAL AREAS. 3. Elective. Open to juniors and seniors. One hour lecture. Six hours' laboratory. This course takes up the elements of structural design.—I and II.

3. PROJECTS IN FORESTRY RECREATION. 3. Required of seniors. One hour lecture. Six hours' laboratory. A course taking up a study of some of the common problems in forest recreation and their logical solution.—I. Prerequisite: Forest Recreation 2.

4. NATIONAL PARK PRACTICE. 2. Required of seniors. Two hours' lecture. A brief history of the laws, practices and policies of the State and National Parks.—II.

15. EUROPEAN PRACTICE IN RECREATIONAL USES OF FORESTS. 3. Elective. Three hours' lecture. A study of practices in Germany, France and Switzerland.—I.

16. FOREST RECREATIONAL CAMPS. 3. Elective. One hour lecture. Six hours' laboratory. A study of the various types of camps being developed in forested areas for recreational uses.—II.

21. RESEARCH PROBLEMS IN FOREST RECREATION. Graduates only. Hours to be arranged.—I and II.

### Department of Silviculture

PROFESSORS STEPHEN AND PRICHARD: ASSISTANT PROFESSOR HEIBERG

*Courses 1 and 3 are required of all undergraduates.*

*Course 4 is required of seniors in Groups I, II, III, IV, V and VII; elective elsewhere.*

*Course 11 is required of seniors in Groups I and II; elective elsewhere.*

*Course 12 is elective for undergraduates.*

*Courses 13 and 14 are elective for graduates and undergraduates.*

*Course 21 is elective for graduates only.*

1. ELEMENTARY SILVICULTURE. 3. Two hours' lecture. Three hours' laboratory. Effect of environment on tree development, the Forest as a society, the effect of the forest on the site, the effect of the site on the forest, moisture conditions within and without the forest, the effect of forest on temperature, soil, etc.—I. Mr. Heiberg.

3. SEEDING AND PLANTING. 3. Two hours' lecture. Three hours' laboratory. A course dealing with all phases of forest propagation especially by seeding and planting.—II. Mr. Prichard.

4. SILVICULTURAL SYSTEMS. 3. Three hours' lecture. Field work in Spring Camp. Methods of reproduction of forests as bearing upon silvicultural systems used in this country and abroad and directions for marking to obtain these results.—I. Mr. Heiberg.

11. FOREST PROTECTION. 2. Two hours' lecture. Protection of forests from fire, wind, frost, animals, and other destructive agencies.—II. Mr. Prichard.

12. SILVICULTURAL SEMINAR. 2. Elective. Two hours' conference and discussion of silvicultural problems. Designed to give the students a thorough review of the literature on silviculture.—I. Mr. Stephen.

13. EXPERIMENT STATION PROBLEMS. 3. Elective. Organization, supervision, opportunities, training, methods and results of silvicultural research. This course is intended to equip a student for carrying on research work in silviculture.—I. Mr. Stephen.

14. REGIONAL STUDIES. 2. Elective. Silvicultural methods applied in the management of the important species in the different forest regions.—I. Mr. Prichard.

21. SILVICULTURAL RESEARCH. ADVANCED SILVICULTURAL PRACTICE. Elective. For graduate students. Hours to be arranged.—I and II. Messrs. Stephen, Prichard and Heiberg.

## Department of Wood Technology

PROFESSOR H. P. BROWN; ASSISTANT PROFESSORS C. C. FORSAITH  
AND INSTRUCTOR W. M. HARLOW

*Course 1 is required of all undergraduates.*

*Course 3 is required of all undergraduates except those specializing in Landscape Engineering.*

*Courses 2, 4, 5, 6, 11 and 12 are elective for graduates and undergraduates.*

*Course 21 is for graduates only.*

1. ELEMENTARY DENDROLOGY. 3. Required sophomore. Four hours each semester, 1 hour lecture, 2 hours' recitation, and 3 hours' laboratory. Studies in the identification and taxonomy of woody plants with special reference to the species native to New York State, and other important forest regions of the United States and abroad. Studies of the silvicultural characteristics and of forest regions are included.—I and II. Mr. Harlow.

2. ORNAMENTAL WOODY PLANTS. 3. Elective. One hour conference and 6 hours' laboratory. The identification and taxonomy of ornamental woody plants.—I. Mr. Brown. Prerequisite: Wood Technology I.

3. WOOD TECHNOLOGY. 3. Required junior. One hour lecture and 6 hours' laboratory. A study of the structural features of wood. Identification of woods by gross and microscopic structure. The physical properties of wood of value in identification. I. Mr. Brown. Prerequisite: Wood Technology I.

4. PAPER-MAKING FIBERS. 3. Elective (required of Pulp and Paper seniors). A morphological and taxonomic study of the fibers used in paper-making. II. Mr. Harlow. Prerequisites: Wood Technology 1 and 3.

11. ADVANCED HISTORICAL MORPHOLOGY. 3. Elective. Two hours' lecture and three hours' laboratory. An evolutionary study of prehistoric and modern woody plants. II. Mr. Forsaith. Prerequisites: Wood Technology 1 and 3.

12. THE MICROTECHNIQUE OF WOODY TISSUE. 3. Elective. One hour lecture and 6 hours' laboratory. Preparation of wood for sectioning, the technique of staining and the use of the microtome. Mr. Harlow. Prerequisites: Wood Technology 1 and 3.

13. **TIMBER PHYSICS.** 3. Elective. Two hours' lecture and three hours' laboratory. A study of the physical and mechanical properties of wood including descriptive lectures, recitations and practical strength tests. Prerequisites: Wood Technology 1 and 3.—I. Lectures and II. Laboratory Practice. Mr. Forsaith.

14. **TIMBERS OF THE WORLD.** Elective. One hour lecture and 6 hours' laboratory and assigned reading. A survey of the more important timbers of the world from the standpoint of structure, physical properties, identification and uses. II. Mr. Brown. Prerequisites: Wood Technology 1 and 3.

21. **RESEARCH IN DENDROLOGY AND WOOD TECHNOLOGY.** Elective for graduates. Hours to be arranged. Messrs. Brown and Forsaith.

### Department of Forest Utilization

PROFESSOR N. C. BROWN; ASSISTANT PROFESSORS HENDERSON,  
HOYLE AND KRAMER

*Courses 1, 3, 4, 5, 6, 7, 12 and 14 are required of all undergraduates electing Utilization.*

*Courses 2, 11, 13, and 21 are elective to graduates and undergraduates who have prerequisites.*

1. **LOGGING.** 3. Three hours' lecture. Required of juniors. History and development of the lumber industry and its relation to forestry. Detailed studies of logging and transportation. Utilization 5 supplements this course and is required of all students taking Utilization.—I. Mr. Brown.

2. **LUMBER MANUFACTURE.** 3. Three hours' lecture. Second semester. Considerable detail is devoted to the work and problems of manufacturing lumber.—II. Mr. Brown.

4. **FOREST PRODUCTS.** 3. Juniors. Three hours' lecture. A study of the so-called minor forest products such as veneer, paper pulp, cooperage, maple sugar, wood distillation, etc.—II. Mr. Kramer.

5. **FIELD LUMBER STUDY.** 3. Following the prerequisite course in Utilization 1, a trip of two weeks to a month's duration is taken either individually or in a party to study the methods of logging and lumber manufacture.—II. Messrs. Brown, Henderson and Hoyle.

6. **PORTABLE MILLING AND WOODLOT LOGGING.** 1. One hour lecture, three hours' laboratory for 8 weeks. Elective, junior. The principles and practice of portable mill work and intensive logging and utilization.—I. Mr. Henderson.

11. **LUMBER SALESMANSHIP.** 2. Two hours' lecture. Elective, seniors or graduates. The principles underlying salesmanship with particular reference to lumber, and their application in the American lumber industry.—II. Mr. Hoyle.

12. BUSINESS METHODS IN THE LUMBER INDUSTRY. 3. Seniors. Three hours' lecture. A review of particular problems affecting the marketing of lumber.—II. Mr. Brown.

13. AMERICAN LUMBER EXPORT TRADE. 2. Two hours' lecture. Elective, seniors or graduates. A study of export methods, ocean shipping, foreign finance and the present and future markets for American Lumber.—I or II. Mr. Brown.

14. DRY KILN ENGINEERING. 3. Seniors or graduates. Two hours' lecture and three hours' laboratory. Consisting of a study of the theoretical and practical application of kiln drying of wood products.—I. Mr. Henderson.

15. ADVANCED DRY KILN ENGINEERING. 3. Seniors and graduates. Conferences and laboratory work. A study of dry kiln problems of the wood-working industries. II. Mr. Henderson

16. REGIONAL STUDIES IN LOGGING AND MILLING. 3. Seniors. Three hours' lecture. A detailed study will be made to supplement elementary course in Lumbering (Utilization).—I. Mr. Hoyle.

17. WOOD PRESERVATION. 3. Two hours' lecture and field trips. Juniors. Wood preservatives and methods of treatment. Prerequisites: Wood Technology I—I. Mr. Kramer.

18. ADVANCED WOOD PRESERVATION. 3. Seniors. The wood preserving industry. Construction and operation of wood preserving plants. Management and costs. Detailed studies in the use of treated wood. II. Mr. Kramer. Prerequisite: Utilization 3.

19. USES OF WOOD. 2. Two hours' lecture. Seniors. Commercial properties, adaptability, supply and utility of the principal American and foreign species manufactured into lumber. II. Messrs. Brown and Henderson.

21. SPECIAL PROBLEMS IN UTILIZATION. Elective for seniors and graduates. Conferences and special library and laboratory research in the lumber and associated industries. Hours to be arranged.—I or II. Messrs. Brown, Henderson, Hoyle and Kramer.

## Department of Forest Zoology

PROFESSOR JOHNSON; INSTRUCTOR MUELLER.

*Zoölogy I is required of all sophomores.*

*Zoölogy 2, 3, 4, 5, 6, and 11 are open to juniors and seniors and graduates.*

*Zoölogy 21 is open only to graduates.*

These courses are designed as a training in the scientific principles of Zoölogy, the relation of animals to forest lands and waters and national and state parks, and in the application of these principles to the economic and social problems concerned with birds, fish and game, grazing, fur-bearing and other forest animals.



1. GENERAL ZOÖLOGY. 3. Required, sophomore. Two hours' recitation. Three hours' laboratory. A course in general principles of Zoölogy.—I. Messrs. Johnson and Mueller.

2. FISH AND GAME. 3. Elective. Two hours' lecture. Three hours' laboratory or field. A course devoted primarily to a study of the general relations of fish, game, fur-bearing and other forest animals to forestry, emphasizing the administrative, economic and social aspects of the problem. Prerequisite: Zoölogy 1 or equivalent and Entomology 1.—II. Messrs. Johnson and Mueller.

3. ECOLOGY OF FRESH WATER ANIMALS. 3. Elective. Two hours' lecture. Three hours' laboratory or field. This course is intended to give a scientific foundation for the application of animal ecology to the aquatic life of the lakes and streams of forest lands and parks.—II.

5. NATURAL HISTORY OF NATIONAL PARKS AND PRESERVES. 3. Elective. Two hours' lecture and three hours' in laboratory or field. A study of the theory and practice of wild life, conservation, and the principles underlying the appreciation and care of the natural history resources, mainly animals, of National and State Parks and wild life preserves. Open to juniors and seniors.—II.

6. GRAZING AND PREDATORY ANIMAL CONTROL. 3. Elective. Two hours' lecture. Three hours' laboratory or field. Intended to show the relation of grazing to forest management, including predatory animal and rodent control, particularly in National Forests. Alternate in even numbered years with Zoölogy 7. Prerequisite: Zoölogy 1.—II. Messrs. Johnson and Mueller.

7. FOREST GAME AND FUR ANIMALS. 3. Covering the natural history, of game and fur-bearing animals. Alternate in odd numbered years with Grazing and Predatory Control. (Zoölogy 6) and not to be given in 1930. Prerequisite: Zoölogy 1.—II. Messrs. Johnson and Mueller.

11. PROBLEMS IN FOREST ZOÖLOGY. Elective; hours to be arranged. Individual study of special forest zoölogy problems. Prerequisites: Zoölogy 1, and 2 or 7.—I or II. Messrs. Johnson and Mueller.

14. ECOLOGY OF FOREST ANIMALS. 3. Elective. Two hours' lecture. Three hours' laboratory or field. This course is complementary to Forest Zoölogy and is devoted to training in the scientific foundations and the application of ecology to the land animals of coniferous and hardwood forests and parks.—I.

21. ECOLOGICAL RESEARCH IN FOREST ZOÖLOGY. Elective. For graduate students.—I and II. Mr. Johnson.



## Courses for Students in the College of Forestry Given by Accessory Instructors

These courses are given by departments in the Colleges of Liberal Arts, Applied Science and Fine Arts of the University.

### BOTANY

1. RANGE AND GRAZING. 2. Elective. Two hours. Lectures, assigned reading and conference upon range and grazing problems.—II. Mr. Bray. Prerequisites: Forest Botany 1 and 2.

### ECONOMICS

1. THE ELEMENTARY PRINCIPLES OF ECONOMICS IN THEIR RELATION TO FORESTRY. 3. Three hours' lecture. This course will present those elementary principles and economic science which are essential as an introduction to a more specialized course in forest economics. Lectures, recitations, readings and reports.—I Mr. Crafer.

5. BUSINESS LAW. 3. Three hours' lecture. A general survey of subjects more closely connected with the ordinary transaction of business.—I.

### FRENCH

10. FRESHMAN FRENCH. 3. For those offering one, two or three years of French for entrance I and II.

### GEOLOGY

2. GENERAL GEOLOGY FOR FORESTRY STUDENTS. 3. I. Mr. C. L. Foster.

### SOILS

1. SOILS. 3. Two hours' lecture, three hours' laboratory or field. A general course including the origin, composition, classification and distribution of soils; their physical, chemical and biological properties and activities and the relation of these to plant growth. II. Mr. H. R. Adams.

### GERMAN

1. ELEMENTARY COURSE. 3. A course in elementary German, three recitations a week. Required, freshmen.—I and II. Mr. Copeland.

3. INTERMEDIATE COURSE. 3. A course designed for those offering two years of German for entrance. I and II. Mr. Copeland.

6. SCIENTIFIC GERMAN. 3. The reading of works of scientific nature in German. Open only to those offering three years of German for entrance. I and II. Mr. Kullmer.

## MATHEMATICS

1. TRIGONOMETRY. 3. The solution of triangles with and without logarithms, including the derivation of the necessary formulae; the study of trigonometric functions as functions; the derivation and application of formulae involving the functions of one or more angles; the transformation of expression involving the functions; the solution of trigonometric equations. I—Staff of Mathematics' department.

## PHYSICS

1. GENERAL PHYSICS. 4. Required of Paper and Pulp students. Three recitation hours, three hours' laboratory. I and II. Mr. Porter. Prerequisites: Entrance Physics, or Course 4 of the department of Physics and Trigonometry.

5. GENERAL PHYSICS. 3. Two hours' lecture, one hour recitation. This course is required of all sophomores except those in the Paper and Pulp and Landscape Engineering groups. Three hours' laboratory required of all students who have not had Physics in High School. I and II. Mr. Porter.

## SPEECH

14. ESSENTIALS. 2. A basic course designed to promote knowledge of and proficiency in, speech. Attention to conversational delivery. Required of seniors who have not had course 15 or its equivalent. II. Mr. Cortright.

15. ESSENTIALS. 3. A basic course designed to promote knowledge of and proficiency in, speech. Special attention is given to observation and study of speakers. Class discussion emphasized. Study of the audience, sources of materials, methods of preparation and delivery, various speech types, and effective presentation. Text book, written and oral reports, maximum of speaking practice. Required of juniors in Pulp and Paper Course. I. Mr. Cortright.

Those desiring further speech training may elect courses in the College of Liberal Arts. Professor Kennedy in charge.

# THE ROOSEVELT WILD LIFE FOREST EXPERIMENT STATION

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FRANKLIN MOON, M.F., Dean

## Honorary Advisory Council of the Roosevelt Wild Life Station

### AMERICAN MEMBERS

Mrs. CORINNE ROOSEVELT ROBINSON	<i>New York City</i>
Hon. THEODORE ROOSEVELT	<i>New York City</i>
Mr. KERMIT ROOSEVELT	<i>New York City</i>
Dr. GEORGE BIRD GRINNELL	<i>New York City</i>
Dr. GIFFORD PINCHOT	<i>Harrisburg, Pa.</i>
Mr. CHAUNCEY J. HAMLIN	<i>Buffalo, N. Y.</i>
Dr. GEORGE SHIRAS, 3rd.	<i>Washington, D. C.</i>
Dr. FRANK M. CHAPMAN	<i>New York City</i>
Dean HENRY S. GRAVES	<i>New Haven, Conn.</i>

### EUROPEAN MEMBERS

VISCOUNT GREY	<i>Fallodon, England</i>
Sir HARRY H. JOHNSON	<i>Arundel, England</i>

### STAFF

Charles Eugene Johnson, A.M., Ph.D., <i>Director</i>
Wilford A. Dence, B.S., <i>Assistant Ichthyologist</i>

### COLLABORATORS

William Converse Kendall, A.M., M.D.
Edward R. Warren, B.S.
Richard A. Muttikowski, Ph.D.
Milton P. Skinner, B.S.

In May, 1919, the Legislature of New York passed a bill instructing the trustees of The New York State College of Forestry to establish the Roosevelt Wild Life Forest Experiment Station. This station was created as a memorial to Theodore Roosevelt for his services for wild life forestry. The duties of the station are, as defined by the New York law as follows:

"To establish and conduct an experimental station to be known as 'Roosevelt Wild Life Forest Experiment Station' in which there shall be maintained records of the results of the experiments and investigations made and research work accomplished; also a library of works, publications, papers and data having to do with wild life together with means for practical illustrations and demonstrations, which library shall, at all reasonable hours, be open to the public."

Furthermore, the duties of the station are to make "investigations, experiments and research in relation to the habits, life histories, methods of propagation and management of fish, birds, game, and food and fur-bearing animals and forest wild life."

The station continues the State survey of the wild life of forest lands and waters which the College has been conducting since 1912. Investigations have been made of the fish and fish food of Oneida Lake, the relation of birds to the Adirondack forests, the relation of forest wild life to park visitors in the Palisades Interstate Park, the Alleghany State Park, and through gifts of funds and co-operation in the Yellowstone National Park. The Adirondack beaver and the muskrat in relation to the fur industry have also been studied. The results of recent investigations have been published in the *Roosevelt Wild Life Bulletin*, of which Volume 4 is now being printed. The editions are limited and do not admit of general free distribution. Application for these station publications should be made to the Director.

BULLETIN

OF

The New York State  
College of Forestry

AT

SYRACUSE UNIVERSITY

NELSON C. BROWN, Acting Dean

*Announcement of Courses*



1930 - 1931

Published Quarterly by The New York State College of Forestry  
at Syracuse, New York, under Act of Aug. 24, 1912

Entered as second-class matter, Oct. 18, 1927, at the Post Office  
at Syracuse University

# CALENDAR

1930—1931

1930

- June 30-Aug. 8.. *Tuesday-Friday*—Summer Session, First Term  
Aug. 11-Sept. 12.. *Monday-Friday*—Summer Session, Second Term  
Sept. 3-Sept. 17.. *Wednesday-Wednesday*—Summer Surveying Camp  
Sept. 8-Sept. 10.. *Monday-Wednesday*—Entrance Examinations  
Sept. 8-Sept. 13—*Monday-Saturday*—Supplementary Examinations  
Sept. 12-Sept. 13.. *Friday-Saturday*—Health Examinations  
Sept. 15-Sept. 18.. *Monday-Thursday*—Registration  
Sept. 15-Sept. 20.. *Monday-Saturday*—Freshman Week  
Sept. 19..... *Friday, 8:00 A. M.*—Classes begin in all colleges  
Nov. 11..... *Tuesday, 9:00 A. M.*—Meeting of Trustees  
Nov. 15..... *Saturday*—Middle of First Semester  
Nov. 26-Nov. 29... *Wednesday, 12:00 M.-Saturday*—Thanksgiving  
Vacation  
Dec. 20-Jan. 4.. *Saturday, 12:00 M.-Monday, 8:00 A. M.*—Christmas  
Vacation

1931

- Jan. 19-Jan. 26.. *Monday-Monday*—Mid-year Examinations  
Jan. 22-Jan. 24.. *Thursday-Saturday*—Entrance Examinations  
Jan. 28..... *Wednesday*—First Semester ends  
Jan. 29-Jan. 31.. *Thursday-Saturday*—Registration  
Feb. 2..... *Monday*—Classes begin  
Mar. 31..... *Tuesday*—Middle of Second Semester  
Apr. 2-Apr. 8.. *Thursday, 12:00 M.-Wednesday*—Easter Vacation  
Apr. 13-Apr. 18.. *Monday-Saturday*—Supplementary Examinations  
May 20-May 27.. *Thursday-Thursday*—Final Examinations  
May 29..... *Friday, 9:00 A. M.*—Annual Meeting of Trustees  
May 30..... *Saturday, 11:00 A. M.*—Meeting of Alumni Association  
May 31..... *Sunday, 10:30 A. M.*—Baccalaureate Service, Gymnasium  
June 1..... *Monday, 10:00 A. M.*—Commencement, Gymnasium



# TRUSTEES OF THE NEW YORK STATE COLLEGE OF FORESTRY

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## Ex-Officio

DR. CHARLES WESLEY FLINT . . . . .	Syracuse, N. Y.
<i>Chancellor</i>	
DR. FRANK P. GRAVES . . . . .	Albany, N. Y.
<i>Commissioner of Education</i>	
HON. HERBERT H. LEHMAN . . . . .	Albany, N. Y.
<i>Lieutenant-Governor</i>	
HON. ALEXANDER MACDONALD . . . . .	Albany, N. Y.
<i>Conservation Commissioner</i>	

## Appointed by Governor

HON. ALFRED E. SMITH . . . . .	New York City
HON. EDMUND H. LEWIS . . . . .	Syracuse, N. Y.
HON. JOHN R. CLANCY . . . . .	Syracuse, N. Y.
HON. HAROLD D. CORNWALL . . . . .	Glenfield, N. Y.
HON. GEORGE W. DRISCOLL . . . . .	Syracuse, N. Y.
HON. WILLIAM H. KELLEY . . . . .	Syracuse, N. Y.
HON. EDWARD H. O'HARA . . . . .	Syracuse, N. Y.
HON. J. HENRY WALTERS . . . . .	New York City
HON. CHARLES A. UPSON . . . . .	Lockport, N. Y.

## Officers of Board

President	Vice-President
ALFRED E. SMITH	JOHN R. CLANCY

# FACULTY OF THE NEW YORK STATE COLLEGE OF FORESTRY

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CHARLES WESLEY FLINT, A.M., D.D., LL.D., PAED.D.  
*Chancellor of the University*

WILLIAM PRATT GRAHAM, PH.D.  
*Vice-Chancellor of the University*

\*FRANKLIN MOON, A.B., 1901 (Amherst); M.F., 1909 (Yale)  
*Dean of the College; Professor of Silviculture*

NELSON COURTLANDT BROWN, A.B., 1906; M.F., 1908 (Yale)  
*Professor of Forest Utilization (Acting Dean)*

JOHN WALLACE STEPHEN, A.B., 1907; M.F., 1909 (Michigan);  
M.PED., 1915 (Mich. State Normal College)  
*Professor of Silviculture*

HARRY P. BROWN, A.B., 1909; A.M., 1910; PH.D., 1914 (Cornell)  
*Professor of Wood Technology*

LAURIE D. COX, A.B., 1903 (Acadia College); S.B. IN LANDSCAPE  
ARCHITECTURE, 1908 (Harvard)  
*Professor of Landscape Engineering*

HENRY R. FRANCIS, B.S., 1910 (Massachusetts Agricultural College)  
*Professor of Forest Recreation*

LOUIS E. WISE, A.B., 1907; PH.D., 1911 (Columbia)  
*Professor of Forest Chemistry*

†REUBEN PARKER PRICHARD, B.S., 1907 (Dartmouth); M.F.,  
1909 (Yale)  
*Professor of Silviculture*

CLARENCE EARL LIBBY, B.S. IN CHEMICAL ENGINEERING, 1916  
(Maine)  
*Professor of Pulp and Paper Manufacture*

JAMES F. DUBUAR, A.B., 1914; M.F., 1915 (Michigan)  
*Director and Professor of Forestry, New York State Ranger School*

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\* Deceased

† Absent on leave.

GURTH A. WHIPPLE

*Professor of Forest Extension*

RICHARD R. FENSKA, B.S., 1911 (Beloit); M.F., 1913 (Yale)

*Professor of Forest Engineering*

CARLYN CHASE DELAVAN A.B., 1914; M.S.F., 1915 (Michigan)

*Professor of Forest Extension and Director of Summer Camp*

CHARLES E. JOHNSON, A.B., 1906; A.M., 1907; PH.D., 1912 (Minnesota)

*Professor of Forest Zoölogy; Director of the Roosevelt Wild Life Forest Experiment Station*

HENRY F. A. MEIER, A.B., 1912; A.M., 1913 (Indiana); PH.D., 1920 (Columbia)

*Professor of Forest Botany*

CARL CHESWELL FORSAITH, A.B., 1913 (Dartmouth); A.M., 1914, PH.D., 1917 (Harvard)

*Professor of Timber Physics*

WALTER W. CHIPMAN, B.S., 1893; A.M., 1904 (Wabash)

*Treasurer*

HIRAM LEROY HENDERSON, A.B., 1915 (Michigan)

*Assistant Professor of Forest Utilization (Acting Head of Utilization)*

HAROLD CAHILL BELYEA, A.B., 1908; A.M., 1911 (Mount Allison); B.Sc.F., 1911 (New Brunswick); M.F., 1916 (Yale)

*Assistant Professor of Forest Engineering*

ALAN F. ARNOLD (Landscape Architecture, Harvard, 1904-08)

*Assistant Professor of Landscape Engineering*

DON M. BENEDICT, B.S., 1917 (Michigan)

*Assistant Professor of Forest Botany*

RAYMOND J. HOYLE, B.S., 1917 (New York State College of Forestry)

*Assistant Professor of Forest Utilization*

ROSS ARTHUR WILLIAMS, B.S.F., 1921 (Montana); M.F., 1923 (Yale)

*Assistant Professor of Forestry at the State Ranger School*

LAURANCE LEE, A.B., 1915; M.F., 1919 (Yale)

*Registrar; Assistant Professor of English*

FRANK B. MYERS, B.S., 1913; M.F., 1914 (New York State College of Forestry)

*Professor of Forest Extension (Acting Director)*

SVEND. HEIBERG, A.B., 1921; M.Sc.F., 1924 (Copenhagen); M.F., 1927 (Yale)

*Assistant Professor of Silviculture*

RAY R. HIRT, B.S., 1917 (Hamline University); M.S., 1924; PH.D., 1928 (New York State College of Forestry)

*Assistant Professor of Forest Botany*

WILFORD A. DENCE, B.S., 1919 (New York State College of Forestry)

*Assistant Director Roosevelt Wild Life Forest Experiment Station*

JAMES D. KENNEDY, B.S., 1923 (Purdue)

*Assistant Professor of Forest Extension*

JUSTUS FREDERICK MUELLER, A.B., 1923 (Hopkins); A.M., 1926; PH.D., 1928 (Illinois)

*Assistant Professor of Forest Zoölogy*

FLOYD C. PETERSON, B. S., 1924; M.S., 1925 (New York State College of Forestry)

*Instructor in Pulp and Paper Manufacture*

AUBREY H. MACANDREWS, B.S., 1925; M.S., 1926 (New York State College of Forestry)

*Instructor in Forest Entomology*

WILLIAM M. HARLOW, B.S., 1925; M.S., 1926; PH.D., 1928 (New York State College of Forestry)

*Instructor in Wood Technology*

JOHN COGSWELL SAMMI, B.S., 1922 (California)

*Instructor in Forest Engineering*

LEROY C. STEGEMAN, B.S., 1928 (Mich. Agri. 1929 College); M.S. (U. of Mich.)

*Instructor in Forest Zoölogy*

J. OSCAR BLEW, JR., B.S., 1927 (New York State College of Forestry)

*Instructor in Wood Utilization*

W. CLEMENT PERCIVAL, B.S., 1923; M.S., 1926 (New York State College of Forestry)

*Assistant in Forest Botany*

ALBERT GOTTLIEB, B.S., 1926 (New York State College of Forestry) M. S., 1927 Harvard

*Assistant in Forest Botany*

ALEXIS JOHN PANSHIN, B.S., 1927 (New York State College of Forestry)

*Assistant in Wood Technology*

LEON S. MINCKLER, B.S., 1928 (New York State College of Forestry)

*Assistant in Forest Botany*

C. H. CARPENTER, B.S., 1929 (New York State College of Forestry)  
*Assistant in Wood Technology*

P. J. HADDOCK, 1926 (Ranger School)  
*Assistant Instructor, Ranger School*

RUBY W. HOWE  
*Secretary to the Dean*

ROBERT S. TRUAIR  
*Cashier*

ELEANOR CHURCH, B.L.E., 1916 (Syracuse)  
*Librarian*

MARTHA L. MEELIG, B.S. IN L.S., 1927 (Syracuse)  
*Reference Librarian*

MIRIAM S. MOCKFORD  
*Secretary, Roosevelt Wild Life Forest Experiment Station*





# THE NEW YORK STATE COLLEGE OF FORESTRY

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The New York State College of Forestry at Syracuse University was created in 1911 by the Legislature of the State of New York. The College is obligated to undertake such special research and state-wide investigation in forestry as will throw light upon and help in the solution of forestry problems which confront the State and the people of New York, and to serve as the State institution for public and student educational work in forestry.

## Location of the College and Facilities for Instruction

In 1913 an appropriation of \$250,000 was made for a forestry building to be located on the campus of Syracuse University. The building was completed and ready for occupancy at the beginning of the second semester in the college year 1916-1917, and is one of the best and most effectively equipped buildings for forestry instruction in the United States.

The location of the New York State College of Forestry at Syracuse is particularly advantageous for carrying out the professional training of students and the state-wide educational work. From the city of Syracuse all sections of the Adirondacks and the entire central and northern regions of New York State are readily accessible by railroads, electric lines and highways. The central location opens conveniently a vast area to field work by the students.

The College is well equipped with apparatus for laboratory work in Utilization, Forestry Botany, Pathology, Dendrology, Wood Technology, Zoölogy, Entomology and Paper Pulp manufacturing, and with instruments for field work in Forest Mensuration and Surveying.

Excellent library facilities are afforded by the special forest library maintained by the College which includes the most important literature in all languages covering all phases of forestry and the sciences having a bearing on forestry. Additional library facilities are furnished by the main library of Syracuse University and the Public Library of the city of Syracuse.

The Legislature of 1930 appropriated \$600,000 for a new science building which will be located on the Syracuse campus near the present college building.

## Plan and Scope of Instruction

Undergraduate instruction comprises the following:

Lectures and field instruction in historical and economic aspects of forestry for all students of the University desiring a knowledge of the meaning of forestry.

The training of professional foresters for positions in the Federal and State Forest Services, or as experts for private forest work of any kind. This training provides for specialization in Forestry, Lumbering, Forest Utilization, Forest Management, Forest Chemistry, Forest Entomology, Forest Recreation, Forest Pathology and Forest Zoölogy.

A special undergraduate course in Paper and Pulp making is offered. Complete information of this course is available in a special descriptive circular which may be obtained on application to the College.

### **Provision for Graduate Work**

The continued advancement in forestry requires a firmer scientific basis. The College acknowledges its responsibility to train men to qualify themselves as competent to carry on independent investigations in the various phases of scientific forestry and in the allied sciences. Further information regarding graduate work will be found on page 18.

### **Training in the State Ranger School**

The new \$250,000 State Ranger School gives a practical course of one year which trains men very thoroughly for such positions as forest guard, forest ranger, tree planting expert and nursery foreman. The work is largely of a practical, intensive, nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of various methods of logging and lumbering and nursery practice and tree planting. It is to be understood that this practical training is not an education in Forestry and that upon completion of the course a man will not be a trained forester. A certificate is given after completion of a year of satisfactory work in the school. A special bulletin of the Ranger School will be sent upon application to the Director, New York State Ranger School, Wanakena, N. Y. The course begins in April and ends in March.

### **Extension Activities**

Instruction and advice by means of lectures, motion pictures, magazine and press articles.

Giving of expert advice to individuals on forestry problems.

Issuing technical bulletins and circulars embodying results of research and investigations in forestry; informative publications for popular consumption.

Special service to producers and consumers of forest products through special market investigations and studies of closer utilization of waste material.

## Special Facilities for Field Work

The College is well equipped with facilities for the essential field work needed by all foresters. The properties available are:

### THE SYRACUSE FOREST EXPERIMENT STATION

This Station is located at 4849 South Salina St., in Syracuse, N. Y., and consists of a total area of ninety acres made up of two farms purchased and consolidated in the spring of 1912. Since 1912 experimental work has been conducted on the area. The experimental nursery operated by the College is located on this tract. A wood lot of 30 acres is also located here and is utilized for demonstration purposes.

### THE SALAMANCA FOREST EXPERIMENT STATION

This tract, acquired by purchase in 1912, consists of 1,016 acres and is located south of Salamanca in Cattaraugus County. The forest on this area is a mixed stand of hardwoods consisting of aspen, chestnut, oak and maple. Experimental thinnings have been made and several plantations established in the open portions of the tract. A plan of management has been prepared.

### THE RANGER SCHOOL FOREST

In 1912 the Rich Lumber Company, of Wanakena, N. Y., presented to Syracuse University for use by the New York State College of Forestry for forestry purposes a tract of 1,850 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks near Wanakena, St. Lawrence County. In December, 1929, The International Paper Company gave an adjoining tract of 500 acres to be added to this forest making the total area of 2350 acres. A forest management plan is being prepared for the station. This area is typical of the cut-over land found in northern New York and is well suited for forestry work. The College Forest is used principally by the students of the State Ranger School at Wanakena, and a forest management plan is being carried out. A branch U. S. Weather Station has been established here. An excellent opportunity for research and experimental work is afforded by the facilities found on this area.

### THE CHARLES LATHROP PACK EXPERIMENTAL FOREST

In 1923 Charles Lathrop Pack presented to Syracuse University for the use of the New York State College of Forestry, a tract of 1,000 acres, situated on Cranberry Lake, known as the "Barber" tract, and on which since 1915 the College of Forestry Camp has been held. This area

serves as a laboratory for the students and is a permanent camp where 10 weeks' practical experience in field methods is given to sophomores each summer. Adjoining this tract are State lands included within the Adirondack Forest Preserve which are available for field demonstration.

### THE CHARLES LATHROP PACK DEMONSTRATION FOREST

In the spring of 1927 an area of 2,250 acres was presented by Charles Lathrop Pack Forestry Trust to Syracuse University for the use of the New York State College of Forestry. This Forest is in the Lake George-Warrensburg region and is located about 3 miles north of Warrensburg on the main highway between New York City and Montreal. Plans for the management have been formulated to demonstrate on this area the practicability of the practice of forestry and to serve as a field laboratory for the studies of silvicultural and other forest problems.

### SHORT COURSES

Special short courses covering instruction in kiln drying and wood preservation are given annually at the College. Such synoptical courses are designed primarily for men actively engaged in these respective fields of operation.

Requests for detailed information of these courses should be addressed to the Dean.

### Publications

From time to time the College issues technical publications, bulletins and circulars on various forestry subjects and problems. A list of such publications will be sent free on application. Most of the publications so listed are for free distribution, while for others a small charge is made.

The News Letter is published quarterly by the College and carries items on the work of the College, news of its Alumni and information of general interest to foresters.

The News Letter is distributed without charge.

Applications for publications should be addressed to the Director of Forest Extension, New York State College of Forestry, Syracuse University, Syracuse, N. Y.

### Communications

All general correspondence should be addressed to the Dean; **inquiries and correspondence concerning entrance should be addressed to the Registrar of the New York State College of Forestry, Syracuse University, Syracuse, N. Y.**

# GENERAL INFORMATION

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## Expenses

All bills *except* those for dormitory rooms and board are payable to W. W. Chipman, Treasurer, New York State College of Forestry, Treasurer's office, Forestry building. Checks should be drawn payable to W. W. Chipman, Treasurer.

Payments for dormitory rooms and board are due Syracuse University and such checks should be drawn payable to W. L. Bassett, Treasurer of Syracuse University.

## MATRICULATION

Every student on entering the University is required to pay a matriculation fee of \$5.00. This fee is not required of students passing from one college to another within the University nor of students transferring from another institution if evidence is submitted that such a fee was paid in the former institution. All students entering upon graduate work pay a matriculation fee of \$5.00.

## FEES

All fees for instruction and incidentals are payable twice a year, on or before the first day of each semester. The treasurer's receipt admits to classes.

Students who at the beginning of the college year, and for at least twelve months prior thereto, have been bona fide residents of the State of New York are exempt from payment of tuition; provided, however, that no student shall be allowed to transfer from the College of Forestry to another college in Syracuse University wherein tuition is charged without first paying \$7.00 per hour for the hours for which he may receive credit in the latter college, with the understanding that from the above amount shall be deducted whatever amount has been collected and retained by the College of Forestry for tuition and fees.

Tuition per year (non-residents).....	\$100.00
Matriculation (paid once) .....	5.00
Sophomore Summer Camp (paid once) not including board..	25.00
*Library Deposit (returnable).....	5.00

## PER SEMESTER

General Fee, first semester.....	30.00
†General Fee, second semester.....	15.00
Students Activities .....	2.75

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\* The Library Deposit will be returned at time of graduation, or on leaving college, if personal notice is given *before* leaving.

† The General Fee for the second semester for students not in attendance the first semester will be \$22.50.



Student Loan Fund and Alumni Association (Sophomore year only) .....	\$1.00
Laboratory Fees (all undergraduates).....	20.00
Laboratory Fees (graduates).....	25.00
Paper and Pulp students \$10 per semester in addition to regular fee beginning first semester sophomore year.	
Diploma Fee (paid at time of graduation).....	10.00

### DORMITORIES

All bills are payable at the office of the University Treasurer. Checks should be drawn payable to Syracuse University. In case payment is not made within two weeks of the time it is due, the student is automatically suspended.

An advance deposit of \$10.00 must be paid by each student when room is engaged or reserved, which will be credited upon the first term's bill and will be refunded in case the student does not become or remain a student in the University, provided the room is given up before September 1.

Rental for room is payable one-half at the beginning of each semester, and no refund is made unless substitute is obtained acceptable to the University. Board is payable quarterly in advance on or before September 20, November 20, February 1, April 1. If a student for good and sufficient reasons is obliged to leave the University, the portion of board unused will be refunded.

Students may re-engage rooms occupied by them for the following year provided that applications are made prior to April 1, but such rooms will not be held longer than May 15 unless contracts are signed and deposits paid by that date.

Furniture and bed linen are supplied by the University; students must supply their own towels, curtains, rugs and pictures.

Board and room in Sims Hall is \$400 a year, including heat and light. Men wishing information on Sims Hall should address Mr. Arthur E. Jenness, Sims Hall, Syracuse.

Men students not in the dormitory or chapter houses must live in houses approved by the University. A list will be sent on request from Dr. L. M. Hickernell. On arrival the student should be sure that he is in an approved house by demanding to see the "Certificate of Approval." This will avoid the necessity of moving at a later date. Students are urged to reserve rooms before September 1. For any information regarding the living conditions, address Dr. L. M. Hickernell, 17-18 Lyman Hall, Syracuse.

### SELF-SUPPORT

Many students attend Syracuse University who earn all or a part of their expenses. The earning of board and lodging is not an extremely difficult matter. Only the most brilliant students, however, can expect to earn their total expenses and maintain satisfactory grades.



The Appointment Office in the Administration Building assists students in securing self-support work. Prospective students may write to the Appointment Office stating the type of work they would like to secure and stating the experience they have had in this work.

### THE CHARLES LATHROP PACK PRIZE

The Charles Lathrop Pack Foundation was established in 1923 by Charles Lathrop Pack, President of the American Tree Association; to encourage students in educational institutions in arousing public interest in forestry and to advance forestry education among the people. A prize of \$100 will be presented annually to the student of the New York State College of Forestry selected by the judges as most worthy of such recognition.

### THE BOY SCOUT SCHOLARSHIP

Through arrangements made with the National Headquarters of the Boy Scouts of America, the College awards each year a scholarship equal in value to the amount of \$100 to the boy scout in the State of New York who is considered most worthy to be the recipient of this honor. Scouts who desire to become applicants for the scholarship should communicate with the Director of Education, Boy Scouts of America, 2 Park Avenue, New York; or with the Registrar of the College. Final award is made on the basis of scout and school records of the applicant.

### PHYSICAL TRAINING

Good health is necessary to attain high scholarship in college and to perform successfully the duties of later life. With this end in view considerable stress is laid upon well-regulated physical training. Every undergraduate student in the College of Forestry is required to take systematic exercise, including swimming in the gymnasium, during the first year of the course unless physically unable to engage in it.

A medical examination is given every student when he enters upon gymnasium work and his exercises are adapted to the requirements of his health and to the development of a sound body.

The athletic interests of the University are in the hands of the Athletic Association. All business is transacted through the Athletic Governing Board, which includes representatives from the faculty, alumni, students, and interested business men of the city.

### REQUIREMENTS FOR ADMISSION

Students entering the regular course leading to a degree must offer 15 units of preparatory work of high school grade. A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. Two to three hours of laboratory, drawing or shop work count as equivalent to one hour of recitation. No candidate is eligible for admission to the professional courses if deficient in more than 1 count of

entrance conditions. Applicants for admission to the New York State College of Forestry must have completed the following subjects with a *general average of 75% for school grades, or a general average of 70% for Regents grades:*

	<i>Units</i>
English (four years).....	4
History (Ancient, Medieval, English, American, or Modern)....	1
Mathematics .....	2½
(All applicants must have completed courses in elementary algebra and plane geometry; the extra ½ unit may be made up by offering a half year's credit in Solid Geometry, Trigonometry, or Intermediate Algebra.)	
Language (Greek, Latin, French, German, or Spanish).....	2
Science .....	1
Elective .....	4½
(Elective units may be offered for extra courses in the subjects listed above; or in Freehand and Mechanical Drawing; Carpenter Shop or Foundry; Economics; Agriculture. Credit cannot be granted for purely commercial subjects like stenography or typewriting, commercial arithmetic, or business writing.)	
Total .....	<hr/> 15

Applicants for admission to the New York State College of Forestry who show a high scholarship rating in their high school work may be given special consideration with regard to the substitution of other subjects for the specific subjects required for entrance.

The College in maintaining a high standard of work believes that satisfactory college work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of forestry and that there is no short cut to the profession. The College urges every young man who is considering the study of forestry to make up his mind to spend all the time necessary for thorough preparation for college work.

Freshmen are accepted *only* at the beginning of the fall semester. There is no opportunity to enter at midyear except on advanced standing from some other college.

# **UNDERGRADUATE WORK IN THE COLLEGE OF FORESTRY**

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## **I. The Four Year Course in General Forestry Leading to the Degree of Bachelor of Science**

This is essentially a general college course in which the student studies forestry as his major subject. He should realize that it must necessarily fall short of the measure of special training necessary for the professional forestry degree. It is designed for students who desire a somewhat intimate knowledge of various branches of forestry for the general satisfaction which such knowledge gives, or for the use they can make of it in a practical way; for those who wish to prepare themselves to teach certain aspects of forestry in the public schools; or for those who after their college course wish to take subordinate positions in lumbering or manufacturing of forest products or subordinate positions in state or national forest service. Such students will not be entitled to the designation of professional foresters merely upon the completion of the four years' course.

## **II. The Four Year Course in Pulp and Paper Manufacture Leading to the Degree of Bachelor of Science**

This course has been established to fill the increasing demand for technical men in the important field of utilization included by the pulp and paper industry. The curriculum of the first year is identical with the general forestry course giving the student the opportunity of determining his future work at the College. The last three years of the course are largely devoted to chemistry, physics, engineering and the technical phases of pulp and paper manufacture. Upon satisfactory completion of the four year program the student should be qualified to enter the pulp and paper industry as a mill control chemist, a technologist in forest products or an operating mill executive.

## **III. The Four Year Course in Landscape Engineering Leading to the Degree of Bachelor of Science**

The object of the course is to train men for certain specialized lines of public service which deal with the growing of trees for their aesthetic value, just as the growing of trees for their commercial value is the problem of technical forestry.

The course aims primarily to supply the constantly increasing demand of states, cities and towns for men with the expert scientific knowledge of the forester and engineer and the artistic appreciation of the landscape

architect, to care for the trees on their streets, parkways and boulevards or administer their parks and reservations. Upon graduation, students should be qualified to act as assistants to city foresters, park superintendents or landscape engineers or to act as construction or planting superintendents upon any form of landscape or park work or as draftsmen or designers in landscape, park or city planning organizations.

The handling of any problem in aesthetic forestry is primarily a problem in landscape design and the College aims to make the training so broad that men are prepared for activity in any recognized field of Landscape Architecture. Students cannot consider themselves professional landscape engineers upon completion of the four years' course. Additional study and professional experience are necessary.

#### **IV. The Five Year Professional Course Leading to the Degree of Master of Forestry**

This course is designed to prepare professional foresters for higher positions of responsibility in the state service, the national forest service and for the position of expert forester for private concerns. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man must of necessity build his professional training upon a foundation of general culture. It is the unanimous opinion of the leaders in forestry education and in the development of forestry policy in this country, that men who expect to follow the profession of forestry act unwisely if they try to make a short cut by eliminating the foundation training. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting the full measure of time advised for preparation. It is advised that every man who takes the four year undergraduate course in the College will go on and complete his fifth year either immediately following the fourth year or after a year or two of practical work.

The fifth year of this five year course is in reality graduate work and subject to the rules governing graduate work in the College of Forestry.

#### **V. Graduate Work**

Graduate work in the College has been planned with the purpose of training two different types of men—first, the man with a more complete, broad, general training in forestry and, second, the specialist, capable of investigating special economic and scientific problems of forestry. The broad, general training is designed to train men as administrators of state, national or private forest or parks. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting at least five years of study and preparation. For this reason it is strongly urged that students who have shown proper ability in the four year course in the College return and complete a fifth year either immediately following the fourth year or after a year or two of practical work. This five year course leads to the degree of Master of Forestry.

There are a vast number of technical and scientific problems which must be investigated before forestry really comes into its own in this country and such problems can be solved only by the man who has been specially trained in methods of investigation and who is thoroughly conversant with the research in his own field. The College of Forestry is offering graduate work in all phases of scientific forestry such as silviculture, wood technology, forest pathology, forest entomology, forest zoölogy, forest chemistry, etc.

The graduate work is open not only to graduates of forestry courses but under certain restrictions, mentioned in another place, to men whose undergraduate work has been along other scientific lines. Two degrees are open to men taking such work: Master of Science and Doctor of Philosophy.

## Rules Governing Graduate Work in the College of Forestry

### DEGREES OFFERED

The following degrees will be conferred upon the satisfactory completion of approved schedules of courses and of the other requirements:

Master of Forestry, Master of City Forestry, Master of Science and Doctor of Philosophy.

It should be understood that the time requirements mentioned below are minimum requirements only. The College does not obligate itself to grant degrees, except upon the completion of all the work in a manner satisfactory to its faculty. The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.

### MAJORS AND MINORS

At the time of enrolling, the candidate for a degree shall submit a schedule consisting of not more than 15 semester hours in each semester. This schedule shall be distributed between a major of nine semester hours and two minors of three semester hours each. If so desired, both the major and one minor may be taken in one department or both minors may be taken in one department. This schedule must receive the approval of the graduate committee and the Dean.

### REQUIREMENTS FOR THE DEGREE OF MASTER OF FORESTRY

For the successful prosecution of the work the ability to read German at sight is necessary.

For candidates who are graduates of approved courses in technical forestry a minimum of one year of residence work is required. For graduates in other courses a minimum of two years' residence work will be necessary.



A thesis or report showing the candidate's ability to complete satisfactorily an investigation upon a topic connected with the candidate's major study must be submitted to the professor in charge not later than May 1st of the year in which the candidate receives his degree. This, if approved by the professor in charge, and if acceptable to the graduate committee is so endorsed and a copy is deposited in the library.

Upon the acceptance of his thesis the candidate will be notified and provided he has satisfactorily passed written examinations in all his courses he will at the same time be instructed when to appear for an oral examination. This examination will be given by the professors under whom the candidate's work has been taken—the Dean or some member of the graduate committee acting as chairman. Any member of the faculty is privileged to be present. This examination will not take place later than June 1st.

#### REQUIREMENTS FOR THE DEGREE OF MASTER OF CITY FORESTRY

A reading knowledge of French is desirable.

For students who are graduates in the course of City Forestry in this College or who have had equivalent courses, a minimum of one complete year of residence work of acceptable grade along approved lines is required.

Similar requirements with regard to thesis and oral examinations as for the Master of Forestry degree are in force.

#### REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

For the successful completion of the work, the ability to read German at sight is necessary.

For students who are graduates in forestry of this institution or others of a similar grade, a minimum of one year of residence work of an acceptable grade is desired.

Students who are graduates in lines other than forestry may be recommended for their degree on the completion of one year of satisfactory residence work provided he has taken at least one minor in forestry. *The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.*

Similar requirements are made as regards thesis and oral examinations as for the preceding two degrees.

#### REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

A candidate must be a graduate of a college of approved standing and his undergraduate standing must have been such as to fit him to pursue advanced work in the subject which he chooses as his major. Before beginning the second year of graduate work the candidate must demonstrate his ability to read scientific German and French at sight.



In case the candidate holds merely the bachelor's degree a minimum of three years' graduate work is required. One year's residence in graduate work at another college may be substituted with the approval of the Dean and graduate committee.

At the time of enrolling, the candidate must choose the major study and two minor studies subject to the same rules as those governing other graduate work. If the candidate is not a graduate in forestry at least one of these minors during two years of his course must be in forestry.

A thesis demonstrating the results of scientific research upon a topic bearing upon his major subject must be completed and receive the approval of the major professor not later than May 1st of the year in which the degree is granted. This must be satisfactory to the Dean and graduate committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the College library.

The candidate is required to pass two examinations, both oral. The preliminary examination will be upon the subjects covered by his major and minors. The final examination will be upon the candidate's thesis.

#### GROUP ELECTIVE SYSTEM—

In September, 1924, a new system of election known as the *Group Elective System* went into effect. By this system the student will, at the proper place in his course, elect his work in one of the following eight groups:

- I. Silviculture and Management.
- II. Forest Protection.
- III. Recreational Forestry.
- IV. Forest Utilization.
- V. Forest Zoölogy.
- VI. Wood Technology—Chemistry.
- VII. Landscape Engineering.
- VIII. Pulp and Paper Manufacture.

The students electing the Pulp and Paper course will take the freshman year as prescribed and start this special work at the beginning of the sophomore year—taking the program of subjects as prescribed in Group VI.

All other students of the College will complete the freshman and sophomore years and the Sophomore Summer Camp. With the beginning of the junior year they will elect one of the five remaining groups.

Student electing Groups I and II and all students in other groups who have elected the course in Silviculture IV and Engineering XI are required to attend the Senior Camp. This will be in session during the month of May of the senior year and will be devoted to field work in Silviculture and Management.

## Program of Courses

### FRESHMAN YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Chemistry 1	4	Chemistry 1	4
Botany 1	3	Botany 2	3
English 1	2	English 1	2
Modern Language	3	Modern Language	3
Mathematics 1	3	Engineering 1	3
Landscape Engineering 1	2	Landscape Engineering 1	2
	<hr/> 17		<hr/> 17

### SOPHOMORE YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Botany 3	3	Botany 4	3
English 2	2	English 2	2
Zoology 1	3	Entomology 1	3
Engineering 2	3	Engineering 3	3
*Physics 5	3	*Physics 5	3
Wood Technology 1	4	Wood Technology 1	4
	<hr/> 18		<hr/> 18

\* Students who propose to take the Landscape Engineering course will take Architectural History instead of Physics.

SOPHOMORE SUMMER CAMP ON CRANBERRY LAKE IN THE ADIRONDACKS, 10 weeks beginning middle of June. Required of all students in Forestry. Prerequisites: Engineering 1, 2, and 3. Instruction by members of the various departments. No junior who has not had the prescribed engineering at the summer camp will be permitted to take Engineering 14. All men attending the camp are required to be able to swim.

## GROUP I—SILVICULTURE AND MANAGEMENT GROUP

### JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Entomology 2	3	Engineering 14	3
Geology 2	3	Gen. Forestry 10	2
Silviculture 1	3	Silviculture 3	3
Silviculture 11	2	Silviculture 4	3
Utilization 1	3	Soils 1	3
Wood Technology 3	3	Utilization 2	3
	<hr/> 17		<hr/> 17

### SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
English 3	2	Engineering 4	3
Botany 12	3	General Forestry 1	3
Engineering 11	3	Gen. Forestry 5	2
Engineering 15	2	Speech 14	2
Engineering 16	3	Utilization 4	3
Gen. Forestry 14	2	Elective or not	4-6
Silviculture 14	2		<hr/> 17-19
Elective or not	0-2		
	<hr/> 17-19		

## FIFTH YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Botany 16	3	Botany 16	3
Engineering 21 or Silviculture 21	3	Engineering 12	3
Engineering 22	3	Engineering 21 or Silviculture 21	3
Wood Technology 13	2	Utilization 16	3
Elective or thesis	6-8	Wood Technology 13	1
	—	Elective or thesis	3-6
	17-19		—
			16-19

## GROUP II—FOREST PROTECTION GROUP

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
English 3	2	Botany 11	
Entomology 2	3	or Entomology 12	3
Geology 2	3	Engineering 14	3
Silviculture 1	3	Gen. Forestry 1	3
Utilization 1	3	Silviculture 3	3
Wood Technology 3	3	Soils 1	3
	—	Group Requirement	2-3
	17		—
			17-18

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Botany 12	3	Botany 15	
Business Law 1	2	or Entomology 16	3
Economics 1	3	Chemistry 2	
Entomology 17		or Entomology 16	3
or Chemistry 2	3	Silviculture 4	3
Gen. Forestry 14		Speech 14	2
or Utilization 17	2-3	Group Requirement	4-6
Silviculture 11	3		—
	—		15-17
	16-17		

*Graduate work to be arranged in consultation between the head of the department, chairman of the Graduate Committee, and the student.*

## GROUP III—RECREATIONAL FORESTRY GROUP†

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
English 3	2	Engineering 14	3
Geology 2	3	Landscape Engineering 4	4
Landscape Engineering 4	4	Recreation 1	3
Recreation 1	3	Recreation 4	2
Silviculture 1	3	Silviculture 3	3
Utilization 1	3	Soils 1	3
	—		—
	18		18

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Business Law 1	2	Gen. Forestry 1	3
Economics 1	3	Landscape Engineering 5	5
Engineering 16	3	*Geology 106	3
Landscape Engineering 5	5	Silviculture 4	2
*Geology 106	3	Speech 14	2
Recreation 3	3	Zoölogy 2	3
	19		17

† Students in Recreational Forestry are not required to attend Senior Camp.

## FIFTH YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Engineering 11	3	*Economics 131	3
Gen. Forestry 14	2	Engineering 12	3
Recreation 15	3	Gen. Forestry 10	2
Silviculture 11	3	Recreation 16	3
Silviculture 14	3	Zoölogy 7	3
Thesis	4	Thesis	4
	18		18

## GROUP IV—FOREST UTILIZATION GROUP ‡

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Accounting 21	3	Economics 1	3
Economics 1	3	Gen. Forestry 1	3
English 3	2	Silviculture 3	3
Silviculture 1	3	Utilization 2	3
Utilization 1	3	Utilization 4	3
Wood Technology 3	3	Group Requirement	3
	17		18

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Botany 12		Speech 14	2
or Wood Tech 13	2-3	Utilization 12	3
*Business Law 1	2	Speech 14	2
Utilization 6	1	**Utilization 11	2
Utilization 14	3	**Utilization 15	3
Utilization 16	3	Utilization 18	3
Utilization 17	3	Wood Tech 13	1
Elective	3	or recommended electives	
	17-18	MM3 (Indust. Engr.)	2
		MM4 (Indust. Invest.)	2
		Util 21	3
			15-18

‡ Field Lumber study (util. 5) during May instead of Senior Camp is required for graduation.

## FIFTH YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Thesis	9	Thesis	9
Transportation 4	3	Wood Technology 13	1
Wood Technology 13	2-3	Utilization 19	2
or Botany 12	3	Elective	3
Elective	3		15
	16		

\* General University courses.

\*\* Recommended electives may be substituted.

## GROUP V—FOREST ZOOLOGY GROUP†

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
English 3	2	Recreation 1	3
Geology 2	3	Silviculture 4	2
Recreation 1	3	Soils 1	3
Silviculture 1	3	Zoology 2	3
Zoology 3	3	Zoology 4	3
Zoology 4	3	Zoology 7	3
	17		17

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Business Law 1	2	*Geology 106	3
Economics 1	3	*Philosophy 1	3
Entomology 2	3	Speech 14	2
*Geology 106	3	*Zoology 12	4
*Philosophy 1	3	Group Requirement	6
Zoology 11	3		18
	17		

\* General University Courses.

† Senior Camp not required of students in this group.

Graduate work to be arranged in consultation between the head of the department, chairman of the Graduate Committee, and the student.

## GROUP VI—WOOD TECHNOLOGY—CHEMISTRY GROUP†

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Chemistry 2	3	Chemistry 2	3
*Physics 3	3	*Physics 3	3
*Chemistry 20	3	*Chemistry 20	3
Wood Technology 3	3	*Botany 25	3
English 3	2	*Mathematics 3	3
Silviculture 1	3	*Mathematics 5	3
	17		18

## SENIOR YEAR

	2nd Sem. Hrs.		1st Sem. Hrs.
*Chemistry, 130	3	*Chemistry 130	3
*Mathematics 104	3	*Mathematics 105	3
Wood Technology 13	2	Wood Technology 13	1
Chemistry 11	3	Wood Technology 12	3
Utilization 1	3	Botany 16	3
Botany 16	3	Speech 14	2
	17	Group Elective	3
			18

† Senior Camp not required for students in this group.

Graduate work to be arranged in consultation between the head of the department, Chairman of the Graduate Committee, and the student.

## GROUP VII—LANDSCAPE ENGINEERING GROUP†

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Landscape Engineering 3	3	Landscape Engineering 3	3
*Architecture 2	3	*Architecture 2	3
Entomology 3	3	Entomology 3	2
*Graphics 41	3	*Freehand Drawing 31	2
Landscape Engineering 4	4	Landscape Engineering 4	4
Silviculture 1	3	Silviculture 4	2
	—	Elective —	3
	19		19

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Business Law 1	2	Landscape Engineering 8	3
*Economics 1	3	*Freehand Drawing	2
*Graphics 43	2	Landscape Engineering 5	5
Landscape Engineering 5	5	Landscape Engineering 6	4
Landscape Engineering 6	4	Landscape Engineering 9	3
Landscape Engineering 7	3	*Speech 14	2
	—		—
	19		19

## FIFTH YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Architecture 1	1	*Architecture 11	2
*Architecture 11	2	*Architecture 12	2
*Architecture 12	2	Engineering 14	3
Botany 12	3	Landscape Engineering 21	3
*Geology 106	3	Landscape Engineering 22	6
Landscape Engineering 22	6	Thesis	4
Landscape Engineering 23	3		—
	—		20
	20		

† Senior Camp not required of students in this group.

## GROUP VIII—PULP AND PAPER MANUFACTURE

## Freshman Year as Prescribed

## SOPHOMORE YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Chemistry 20, Qualitative	3	*Chemistry 20, Qualitative	3
*Physics 1	4	*Physics 1	4
English 3	3	Speech 14	2
*Math. 2 Analytics	3	*Math. 3, Analytics	3
*Drawing 1	1	*Mechanical Drawing 3	2
*Mechanical Drawing 2	1	Wood Technology 1	4
Wood Technology 1	4		—
	—		18
	19		

\* General University courses.

Three Months' Summer Work in a Pulp or Paper Mill



## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Chemistry 130, Quantitative	3	*Chemistry 130, Quantitative	3
Forestry Chemistry 2, Organic	3	Forest Chemistry 2, Organic	3
Economics 1	3	*Math. 4, Calculus	3
Pulp and Paper Manufacturing:		Pulp and Paper Manufacturing:	
1—Technology	3	1—Technology	3
2—Laboratory	2	2—Laboratory	2
3—Machinery	2	3—Machinery	2
4—Mill Analyses	2	5—Paper Testing	2
6—Pulp Testing	1	6—Pulp Testing	1
	19		19

*Three Months' Work in a Pulp or Paper Mill*

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Wood Technology 3	3	Business Law 1	2
*Business Law 1	2	Wood Technology 5—Fibres	3
*Heat and Power 1	3	*Mechanical Laboratory 3	1
*Electrical Machinery 5	3	*Electrical Machinery 6	3
*Electrical Laboratory 5	1	*Electrical Laboratory 6	1
Pulp and Paper Mfg.—9 Problem	1	Pulp and Paper Mfg.—10 Problem	5
Pulp and Paper Mfg.—7 Coloring	2		
Forest Chemistry 11—Cellulose	3		15
	18		

*\* General University courses.*

## Description of Courses in the College of Forestry

Note—A numeral following the title of the course indicates the number of credit hours a week. A credit hour means one recitation (or lecture) hour per week. Three laboratory hours are equivalent to one credit hour. The Roman numeral following the description indicates the semester in which the course is given.

## Department of Forest Botany

PROFESSOR MEIER; ASSISTANT PROFESSORS BENEDICT AND HIRT;

ASSISTANTS PERCIVAL, GOTTLIEB AND MINCKLER

*Courses 1, 2, 3, 4 required of undergraduates.**Courses 11, 12, 13, 14, 15 elective for graduates or undergraduates.**Course 16 for seniors or graduates.**Course 21 for graduates only.*

1. FOREST BOTANY. 3. Required of freshman. Two hours of lecture. Three hours of laboratory. An elementary course throughout the first year dealing with structure and functions of plants and the fundamental problems of Botany, together with a general survey of the plant kingdom.—I. Messrs. Meier, Hirt, Percival and Minckler.

2. FOREST BOTANY. 3. Required of freshman. A continuation of FOREST BOTANY 1.—II. Messrs. Meier, Hirt, Percival and Minckler.

3. PLANT PHYSIOLOGY. 3. Required of sophomores. Lectures, recitations, and laboratory. A course designed to teach the fundamental physiological processes involved in growth of plants.—I. Messrs. Meier, Benedict and Gottlieb. Prerequisites: Courses 1 and 2.

4. **SYSTEMATIC BOTANY.** 3. Required of sophomores. Lectures, recitations, laboratory and field-work. A course dealing with the fundamentals of plant classification and identification.—II. Messrs. Benedict and Gottlieb. Prerequisites: Courses 1 and 2.

11. **GENERAL MYCOLOGY.** 3. Elective. One hour of lecture. Four to six hours of laboratory. A course in the structure and life histories of fungi.—II. Mr. Hirt. Prerequisites: Courses 1, 2 and 3.

12. **FOREST PATHOLOGY.** 3. Elective. Two hours of lecture. Three hours of laboratory. A course of lectures and laboratory work upon the diseases of plants in general with especial emphasis upon diseases of trees.—I. Mr. Hirt. Prerequisites: Courses 1, 2 and 3.

13. **CULTURE METHODS.** 3. Elective. Six hours of laboratory and conference. A study of technique in the isolation and pure culture of fungi.—II. Mr. Benedict. Prerequisites: Course 12.

14. **ADVANCED MYCOLOGY.** 3. Elective. A year course in the classification of fungi.—I. Mr. Hirt. Prerequisites: Courses 11 and 12.

15. **ADVANCED FOREST PATHOLOGY.** 3. Elective. One hour lecture. Six hours of laboratory.—II. Mr. Hirt. Prerequisites: Courses 11 and 12.

21. **RESEARCH IN FOREST BOTANY AND PATHOLOGY.** Elective for graduates.—I and II. Messrs. Bray, Meier and Hirt.

16. **ADVANCED PLANT PHYSIOLOGY.** 3. A year course open to seniors and graduates. A consideration of the fundamental characteristics of living matter and life processes in plants. Hours to be arranged. Mr. Meier.

## Department of Forest Chemistry

PROFESSOR WISE AND LIBBY; INSTRUCTOR PETERSON

*Courses in Forest Chemistry 2 and 11 are required of all students in Groups IV and VII. They are open to properly qualified students in Forestry. All courses in paper and pulp manufacture are required of students entering this field. Forest Chemistry 12 and 21 are open only to properly qualified graduate students.*

## Forest Chemistry

1. **GENERAL INORGANIC CHEMISTRY.** 4. Required of all freshmen. Given in the department of Chemistry of the College of Liberal Arts.—I and II. Mr. Norton, Mr. Baker and Instructors.

2. **ORGANIC CHEMISTRY.** 3. P. and P. junior required. Two hours' lecture and 3 hours' laboratory. This is primarily an elementary course in organic chemistry.—I and II. Mr. Wise. Prerequisite: Chemistry 1.

11. **CHEMISTRY OF CELLULOSE.** c. P. and P. senior required. Three hours' lecture. An elementary course in the chemical and physical properties and the use of cellulose and its derivatives.—I. Mr. Wise. Prerequisite: Forest Chemistry 2.

12. CHEMISTRY OF CELLULOSE. 2. Graduate elective. Two hours' lecture (or seminar). Lecture will cover researches on the constitution, properties, and uses of cellulose and its derivatives. This is essentially a graduate course.—II. Mr. Wise. Prerequisites: General Chemistry, Qualitative and Quantitative Analysis, Organic Chemistry, and a reading knowledge of German.

13. SEMINAR. 1. Elective. One hour weekly. Reports on the recent chemical literature dealing with forest products.—I and II. Mr. Wisc. Prerequisite: Chemistry 3 or its equivalent.

21. RESEARCH IN FOREST CHEMISTRY. Graduate elective. Hours to be arranged. Problems in forest chemistry and organic chemistry will be assigned to properly qualified graduate students.—I and II. Mr. Wise. Prerequisites depend upon the nature of the problem.

## Pulp and Paper Manufacture

*Special bulletin describing the work of the paper and pulp course should be obtained by writing for it to the Registrar of the College. This course is subject to revision from year to year.*

1. TECHNOLOGY. 3. P. and P. junior required. Three hours' lecture. Study of the processes employed in the manufacture of pulp and paper.—I and II. Mr. Libby. Prerequisites or parallel courses: Chemistry 20 and 130.

2. TECHNOLOGY LABORATORY. 2. P. and P. junior required. Six hours' laboratory. Laboratory demonstrations of the principles of pulp and paper manufacture described in Course 1.—I and II. Mr. Peterson. Prerequisite or parallel courses Pulp and Paper 1 and 3.

3. MACHINERY. 2. First semester and 2. second semester. P. and P. junior required. Three hours' lecture. Lectures on the design, construction and operation of machinery used in the pulp and paper industry.—I and II. Mr. Peterson. Prerequisite or parallel courses: Physics 1 and P. and P. 1.

4. MILL ANALYSES. 2. P. and P. junior required. Six hours' laboratory. Evaluation of materials used in the manufacture of pulp and paper.—I and II. Mr. Libby. Prerequisite or parallel courses: Chemistry 20 and 130 and P. and P.

5. PAPER TESTING. 2. P. and P. junior required. Six hours' laboratory. Physical, chemical and microscopical characteristics of papers.—II. Mr. Libby. Prerequisites or parallel courses: P. and P. 4.

6. PULP TESTING. 1. P. and P. junior required. Three hours' laboratory. Physical and chemical properties of pulp. Oil and coal analysis.—I and II. Mr. Peterson. Prerequisites or parallel courses: P. and P. 4.

7. COLORING. 2. P. and P. senior required. Six hours' laboratory. Evaluation and identification of dyestuffs and the development of color formulas for dyeing pulp and paper.—I. Mr. Libby. Prerequisites or parallel courses: P. and P. 4.

9. PROBLEM. 1. P. and P. senior required. A report covering a systematic survey of all available literature on some problem of interest to the pulp and paper industry.—I. Messrs. Wise, Libby and Peterson. Prerequisites or parallel courses: Pulp and Paper Mfg. 1 to 5. Forest Chem. 2 and 11 and Chem. 20 and 130.

10. PROBLEM. 4. P. and P. senior required. Laboratory development of the problem formulated in course 9.—II. Messrs. Wise, Libby and Peterson. Prerequisite: Pulp and Paper Mfg. 9.

## General Forestry

*Courses 1 and 5 are required of undergraduates, Groups I-IV.*

*Course 10 is required of seniors in Group I.*

*Course 14 is elective for seniors.*

1. HISTORY OF FORESTRY. 3. The development of forestry as influenced by the growth of human culture and civilization.—II. Mr. Lee.

5. FOREST SEMINAR. 2. Required. Assignment and discussion of current forestry subjects.—II. Mr. Fenska.

10. FOREST LAWS AND POLICIES. 2. Required for juniors in the Silviculture and Management group. Two hours' lecture. The object of this course is to gain knowledge of the important laws affecting the National Forests and Public Domain. The forest laws of the principal states engaged in forestry work will be studied in detail. Forest taxation, legislation, administration and state and national policies are discussed.—II. Mr. Hoyle.

14. NATIONAL FOREST PRACTICE. 2. Elective for seniors. Two hours' lecture. The creation and organization of United States Forest Service; with particular reference to the protection, administration and development of the National Forests. Lectures and reports.—I. Mr. Frank B. Myers.

## Department of Forest Engineering

PROFESSOR FENSKA; ASSISTANT PROFESSOR BELYEA;

INSTRUCTOR SAMMI

*Courses 1, 2, 3, are required of all undergraduates, and are prerequisite for Sophomore Summer Camp.*

*Summer Camp Engineering is also required.*

*Courses 11 and 12 are elective to graduates and undergraduates.*

*Courses 21 and 22 are elective to graduates only.*

1. PLANE SURVEYING. 3. Required freshman. Two hours' lecture. Three hours' field work. A preliminary course in the use of surveying instruments and field methods. Mapping and office computations. II. Messrs. Fenska and Sammi. Prerequisite: L. E. I, first sem.

2. PLANE SURVEYING. 3. Required sophomore. Two hours' lecture. Three hours' field work. Continuation of Engineering 1. I. Messrs. Fenska and Sammi. Prerequisites: Engineering I, and L. Engineering I.

3. FOREST MENSURATION. 3. Required sophomore. Three hours' lecture. A study of the measurements of volume of logs, trees and forest; estimating and mapping of timber, compilation of volume tables and collection of data in a detailed study of a forest area by stem analysis for purpose of predicting future possibilities. II. Mr. Belyea.

4. FOREST FINANCE. 3. Three hours' lecture. The business aspects of forest management and the principles of economics and finance underlying the administration of forest properties.—II. Mr. Belyea.

11. FOREST REGULATION. 3. Three hours' lecture. Organization of forests for management. The normal and empirical forest, rotation and methods of regulating the cut.—I. Mr. Belyea.

12. APPLIED FOREST MANAGEMENT. 3. The application of management to specific forests and areas as demonstrated by actual practice in the United States.—II. Mr. Belyea.

14. TOPOGRAPHIC SURVEYING. 3. One hour lecture. Six hours' field work. Methods of topographic mapping, by aneroid and pacing, transit and stadia, abney level and slope chain, plane table with telescopic alidade and trigonometric leveling.—II. Messrs. Fenska and Sammi. Pre-requisite: Summer Camp Engineering.

15. FOREST INCREMENT. 2. Two laboratory periods. A continuation of Forest Mensuration as applied to the principles of determining increment and yields.—I. Mr. Belyea.

16. FOREST ENGINEERING. 3. Seniors. Two hours' lecture, three hours' field work. The application of engineering principles in the construction of trails, roads, bridges, logging railroads, chutes, flumes, dams, telephone lines, fire towers, cabins, etc., for the development and proper utilization of a forest.—I. Mr. Fenska.

21. MANAGEMENT PROBLEMS. Elective for graduate students only. Individual study of an assigned problem in Forest Management. Hours to be arranged.—I and II. Mr. Belyea.

22. ADVANCED FOREST REGULATION. 3. Elective to graduates only. Problems will be given the student with seminar consultation and outside reading.—II. Mr. Belyea.

## Department of Landscape Engineering

PROFESSOR COX; ASSISTANT PROFESSOR ARNOLD; INSTRUCTOR WAGNER

*Course 0 is for students in other colleges; not Forestry.*

*Course 1 required of all freshmen.*

*Course 2 required of sophomores in Landscape Engineering.*

*Courses 3 and 4 are required of juniors in Landscape Engineering.*

*Courses 5, 6, 7, 8 and 9 are required of seniors in Landscape Engineering.*

*Courses 21, 22, 23 are for graduates or specially qualified students.*

0. THE APPRECIATION OF LANDSCAPE ARCHITECTURE. 3. Not open to students of the College of Forestry but to other students of the University. Three hours' lecture. The elements and principles of Landscape Design. Lectures and reports.—II. Messrs. Cox and Arnold.



1. DRAFTING AND LETTERING. 2. Required for all members of the freshman class. Two hours' laboratory with additional hours drafting.—I and II. Messrs. Cox, Arnold and Wagner.

2. ARCHITECTURAL HISTORY. 3. Three hours lecture. The history of the Architectural Styles with especial reference to Landscape Architecture. I and II. Messrs. Cox and Arnold.

3. PLANT MATERIALS. 3. Lectures, field trips and preparation of planting plans. This course covers deciduous and evergreen shrubs, vines and perennials—I and II. Mr. Arnold.

4. LANDSCAPE DESIGN. 4. Three hours' drafting, three hours' lecture, junior. Elements and principles of Landscape Engineering.—I and II. Messrs. Cox, Arnold and Wagner.

5. LANDSCAPE DESIGN. 5. Twelve hours' drafting, with occasional lectures, senior. Elementary designs in Landscape Engineering.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 4.

6. LANDSCAPE ENGINEERING CONSTRUCTION. 4. Senior. Two hours' lecture. Three hours' drafting. Highway design and construction, grading and drainage plans, and details of landscape construction.—I and II. Mr. Cox. Prerequisite: Landscape Engineering 4.—Engineering I.

7. CITY PLANNING. 3. Senior. Two hours' lecture. One hour reports and assigned reading. The economic, aesthetic and engineering principles of modern City planning.—I. Messrs. Cox and Arnold.

8. SHADE AND ORNAMENTAL TREES. 3. Senior. Three hours' lecture. Deciduous and evergreen trees used for shade or ornamental purposes—their identification, pruning, care and use.—II. Mr. Cox. Prerequisite: Landscape Engineering 3-4.

9. LANDSCAPE SEMINAR AND THESIS. 3. Assignment and discussion of important problems. Senior.—II. Mr. Cox.

21. LANDSCAPE ENGINEERING DETAILS. 3. Elective. One hour lecture. Six hours' drafting. Design of construction used in Landscape Engineering.—I or II. Messrs. Cox and Arnold. Prerequisite: Landscape Engineering 4 and 5.

22. LANDSCAPE ENGINEERING DESIGN. 6. Elective. Advanced landscape engineering design for fifth year students.—I and II. Messrs. Cox and Arnold.

23. ADVANCED CITY PLANNING. 3. Elective. Special problems in park and city planning for fifth year students.—I. Messrs. Cox and Arnold.



## Department of English

ASSISTANT PROFESSOR LEE

*Course 1 is required of all freshmen.*

*Course 2 is required of sophomores in Groups I-VI.*

*Course 3 is required of sophomores in Group VII; juniors in Groups II-V; seniors in Group I.*

1. ELEMENTS OF COMPOSITION. 2. Two hours' recitation. An intensive drill in the principles of prose composition together with a study of selected English masterpieces. I and II. Mr. Lee and Assistant.

2. LITERATURE. 2. Two hours' recitation. A detailed study of the longer forms of composition together with a brief survey of English literature. I and II. Mr. Lee and Assistant.

3. TECHNICAL EXPOSITION. 2. Two hours' recitation. A study of English as applied in the writing of reports, technical and professional papers, and business correspondence. I. Mr. Lee.

## Department of Forest Entomology

INSTRUCTOR MACANDREWS; ASSISTANT MATHERS

*Course 1 is required of all undergraduates in Forestry.*

*Courses 2 and 3 required in certain groups.*

*Courses 11, 12, 13, 14, 15, 16, and 17 may be taken either as elective undergraduate work or as minors in the graduate courses.*

*Course 21 can be taken only as major graduate work.*

1. ELEMENTARY ENTOMOLOGY. 3. Required, Sophomore. Two hours' recitation. Three hours' laboratory. A general course devoted to the study of morphology, life histories and general classification of insects.—II. Forest Zoölogy 1 is prerequisite for this course. Mr. ———.

2. FOREST ENTOMOLOGY. 3. Required Junior Protection. Two hours' lecture. Three hours' laboratory. Devoted to a study of insects of economic importance in Forestry.—I. MacAndrews. Course 1 is prerequisite.

3. INSECTS AFFECTING SHADE TREES AND ORNAMENTAL SHRUBS. 5. Required, Junior Landscape Engineering. First semester. Two hours' lecture. Three hours' laboratory. Second semester 1 hour lecture, 3 hours' laboratory. Intended primarily for students specializing in City Forestry.—I and II. Mr. MacAndrews. Course 1 prerequisite.

11. ELEMENTARY INSECT TAXONOMY. 3. Elective.—I or II. MacAndrews. Courses 1 and 2 are prerequisite.

12. INSECT ANATOMY. Elective. A more detailed study of the anatomy of certain insects not studied in previous courses.—II. Mr. ———.

13. INSECT TAXONOMY. 3. Elective. A more detailed study of classification of some particular group of insects.—I or II. MacAndrews.

14. INSECT HISTOLOGY. 3. Elective. A study of the tissues and microscopic anatomy of insects and the methods used in the preparation of insect material for microscopic study.—I or II. Mr. ———.

15. PROBLEMS IN FOREST ENTOMOLOGY. 3. Elective. Individual study of small problems in forest entomology.—I or II. MacAndrews.

16. SEMINAR. 2. Elective. Library investigation, reports and discussion of forest insects of great economic importance. Two hours' conference per week. By appointment.—II. MacAndrews.

17. INSECT ECOLOGY. 3. Elective. Two hours' lecture. Three hours' laboratory or field. A study of the various interacting environmental or habitat factors which influence the relative abundance and distribution of insects, and the practical application of ecological principles to problems in forest entomology. By appointment.—I. Mr. MacAndrews.

21. RESEARCH PROBLEMS IN FOREST ENTOMOLOGY. Elective. For graduate students.—I and II. Mr. ———.

## Department of Recreational Forestry

PROFESSOR FRANCIS

*Courses 1, 3 and 4 are required of all undergraduates in Recreation.*

*Courses 15 and 16 are elective for graduates or undergraduates.*

*Course 21 is for graduates only.*

1. RECREATIONAL USES OF FOREST AREAS. 3. Two hours' lecture. Three hours in field or in assignments. A general course to teach the fundamental principles of the public use of forest areas for recreation and the relation of recreation to other forests uses.—I and II.

2. DEVELOPMENT OF FOREST PARK RECREATIONAL AREAS. 3. Elective. Open to juniors and seniors. One hour lecture. Six hours' laboratory. This course takes up the elements of structural design.—I and II.

3. PROJECTS IN FORESTRY RECREATION. 3. One hour lecture. Six hours' laboratory. A course taking up a study of some of the common problems in forest recreation and their logical solution.—I. Prerequisite: Forest Recreation 1.

4. NATIONAL PARK PRACTICE. 2. Two hours' lecture. A brief history of the laws, practices and policies of the State and National Parks.—II.

15. EUROPEAN PRACTICE IN RECREATIONAL USES OF FORESTS. 3. Elective. Three hours' lecture. A study of practices in Germany, France and Switzerland.—I.

16. FOREST RECREATIONAL CAMPS. 3. Elective. One hour lecture. Six hours' laboratory. A study of the various types of camps being developed in forested areas for recreational uses.—II.

21. RESEARCH PROBLEMS IN FOREST RECREATION. Graduates only. Hours to be arranged.—I and II.

## Department of Silviculture

PROFESSORS STEPHEN AND PRICHARD: ASSISTANT PROFESSOR HEIBERG

*Courses 1 and 3 are required of all undergraduates.*

*Course 4 is required of seniors in Groups I, II, III, IV, V and VII; elective elsewhere.*

*Course 11 is required of seniors in Groups and II; elective elsewhere.*

*Course 12 is elective for undergraduates.*

*Courses 13 and 14 are elective for graduates and undergraduates.*

*Course 21 is elective for graduates only.*

1. FOUNDATION OF SILVICULTURE. 3. Two hours' lecture. Three hours' field work. An analysis of the site factors and their effect on forest vegetation. The reaction of the forest on the site. The forest as a community. I. Mr. Heiberg.

3. SEEDING AND PLANTING. 3. Two hours' lecture. Three hours' laboratory. A course dealing with all phases of forest propagation especially by seeding and planting.—II. Mr. Prichard.

4. SILVICULTURE SYSTEMS. 3 or 2. Three hours' lecture. Field work in Spring Camp. Reproduction cuttings, intermediate cuttings, cultural operations as used in this country and abroad. In Spring Camp is given preparation of plans for silvicultural treatment of forest tracts together with silvicultural operations in actual practice.—II. Mr. Heiberg.

11. FOREST PROTECTION. 2. Two hours' lecture. Protection of forests from fire, wind, frost, animals, and other destructive agencies.—I. Mr. Prichard.

12. SILVICULTURAL SEMINAR. 2. Elective. Two hours' conference and discussion of silvicultural problems. Designed to give the students a thorough review of the literature on silviculture.—I. Mr. Stephen.

13. EXPERIMENT STATION PROBLEMS. 3. Elective. Organization, supervision, opportunities, training, methods and results of silvicultural research. This course is intended to equip a student for carrying on research work in silviculture.—II. Mr. Stephen.

14. REGIONAL STUDIES. 2. Elective. Silvicultural methods applied in the management of the important species in the different forest regions.—II. Mr. Prichard.

21. SILVICULTURAL RESEARCH. ADVANCED SILVICULTURAL PRACTICE. Elective. For graduate students. Hours to be arranged.—I and II. Messrs. Stephen, Prichard and Heiberg.

## Department of Wood Technology

PROFESSOR H. P. BROWN; PROFESSOR C. C. FORSAITH; AND INSTRUCTOR  
W. M. HARLOW

*Course 1 is required of all undergraduates.*

*Course 3 is required of all undergraduates except those specializing in Landscape Engineering.*

*Courses 2, 4, 5, 6, 11 and 12 are elective for graduates and undergraduates.*

*Course 21 is for graduates only.*

1. ELEMENTARY DENDROLOGY. 4. Required sophomore. Four hours' each semester, 1 hour lecture, 2 hours' recitation, and 3 hours' laboratory. Studies in the identification and taxonomy of woody plants with special reference to the species native to New York State, and other important forest regions of the United States. Studies of silvicultural characteristics and forest regions are included.—I and II. Mr. Harlow.

2. ORNAMENTAL WOODY PLANTS. 3. Elective. One hour conference and 6 hours' laboratory. The identification and taxonomy of ornamental woody plants.—I. Mr. Brown. Prerequisite: Wood Technology I.

3. WOOD TECHNOLOGY. 3. Required junior. One hour lecture and 6 hours' laboratory. A study of the structural features of wood. Identification of woods by gross and minute structure. The physical properties of wood of value in identification.—I. Mr. Brown. Prerequisite: Wood Technology I.

4. PAPER-MAKING FIBRES. 3. Elective (required of Pulp and Paper seniors). A morphological and taxonomic study of the fibres used in paper-making.—II. Mr. Forsaith. Prerequisites: Wood Technology 1 and 3.

11. ADVANCED HISTORICAL MORPHOLOGY. 3. Elective. Two hours' lecture and three hours' laboratory. An evolutionary study of prehistoric and modern woody plants.—I or II. Mr. Forsaith. Prerequisites: Wood Technology 1 and 3.

12. THE MICROTECHNIQUE OF WOODY TISSUE. 3. Elective. One hour lecture and 6 hours' laboratory. Preparation of wood for sectioning, the technique of staining, and the use of the microtome.—I or II. Mr. Harlow. Prerequisites: Wood Technology 1 and 3.

13. TIMBER PHYSICS. 3. Elective. Two hours' lecture and three hours' laboratory. A study of the physical and mechanical properties of wood including descriptive lectures, recitations and practical strength tests. Prerequisites: Wood Technology 1 and 3.—I. Lectures and II. Laboratory Practice. Mr. Forsaith.

14. TIMBERS OF THE WORLD. 3. Elective. One hour lecture and six hours' laboratory and assigned reading. A survey of the more important

timbers of the world from the standpoint of structure, physical properties, identification, and uses. II. Mr. Brown. Prerequisites: Wood Technology 1 and 3.

21. RESEARCH IN DENDROLOGY AND WOOD TECHNOLOGY. Elective for graduates. Hours to be arranged. Messrs. Brown, Forsaith and Harlow.

## Department of Forest Utilization

PROFESSOR HENDERSON; ASSISTANT PROFESSOR HOYLE; INSTRUCTOR BLEW.

*Courses 1, 2, 4, 5, 6, 11, 12, 14 and 17 are required of all undergraduates electing Utilization.*

*Courses 2, 13 and 21 are elective to graduates and undergraduates who have prerequisites.*

1. LOGGING. 3. Three hours' lecture. Required of juniors. History and development of the lumber industry and its relation to forestry. Detailed studies of logging and transportation. Utilization 5 supplements this course and is required of all students taking Utilization.—I. Mr. Henderson.

2. LUMBER MANUFACTURE. 3. Three hours' lecture. Second semester. Considerable detail is devoted to the work and problems of manufacturing lumber.—II. Mr. Henderson.

4. FOREST PRODUCTS. 3. Juniors. Three hours' lecture. A study of the so-called minor forest products such as veneer, paper pulp, cooperage, maple sugar, wood distillation, etc.—II. Mr. Blew.

5. FIELD LUMBER STUDY. Following the prerequisite course in Utilization 1, a trip of two weeks to a month's duration is taken either individually or in a party to study the methods of logging and lumber manufacture.—II. Messrs. Henderson, Hoyle and Blew.

6. PORTABLE MILLING AND WOODLOT LOGGING. 1. One hour lecture, three hours' laboratory for eight weeks. Elective, junior. The principles and practice of portable mill work and intensive logging and utilization.—I. Mr. Henderson.

11. LUMBER SALESMANSHIP. 2. Two hours' lecture. Elective, seniors or graduates. The principles underlying salesmanship with particular reference to lumber, and their application in the American lumber industry.—II. Mr. Hoyle.

12. BUSINESS METHODS IN THE LUMBER INDUSTRY. 3. Seniors. Three hours' lecture. A review of particular problems affecting the marketing of lumber.—II. Mr. Hoyle.

13. AMERICAN LUMBER EXPORT TRADE. 2. Two hours' lecture. Elective, seniors or graduates. A study of export methods, ocean shipping, foreign finance and the present and future markets for American Lumber.—I or II. Mr. Brown.



14. DRY KILN ENGINEERING. 3. Seniors or graduates. Two hours' lecture and three hours' laboratory. Consisting of a study of the theoretical and practical application of kiln drying of wood products.—I. Mr. Henderson.

15. ADVANCED DRY KILN ENGINEERING. 3. Seniors and graduates. Conferences and laboratory work. A study of dry kiln problems of the wood-working industries.—I. Mr. Henderson.

16. REGIONAL STUDIES IN LOGGING AND MILLING. 3. Seniors. Three hours' lecture. A detailed study will be made to supplement elementary course in Lumbering (Utilization).—II. Mr. Hoyle.

17. WOOD PRESERVATION. 3. Two hours' lecture and field trips. Juniors. Wood preservatives and methods of treatment. Prerequisites: Wood Technology. I—I. Mr. Blew.

18. ADVANCED WOOD PRESERVATION. 3. Seniors. The wood preserving industry. Construction and operation of wood preserving plants. Management and costs. Detailed studies in the use of treated wood.—II. Mr. Blew. Prerequisite: Utilization 17.

19. USES OF WOOD. 2. Two hours' lecture. Seniors. Commercial properties, adaptability, supply and utility of the principal American and foreign species manufactured into lumber.—II. Messrs. Brown and Henderson.

21. SPECIAL PROBLEMS IN UTILIZATION. Elective for seniors and graduates. Conferences and special library and laboratory research in the lumber and associated industries. Hours to be arranged.—I or II. Messrs. Brown, Henderson and Hoyle.

## Department of Forest Zoology

PROFESSOR JOHNSON; ASSISTANT PROFESSOR MUELLER; INSTRUCTOR STEGEMAN.

*Zoölogy 1 is required of all sophomores.*

*Zoölogy 2, 3 and 11 are open to juniors and seniors.*

*Zoölogy 21 is open only to graduates.*

These courses are designed as a training in the scientific principles of Zoölogy, the relation of animals to forest lands and waters and national and state parks, and in the application of these principles to the economic and social problems concerned with birds, fish and game, furbearing and other forest animals.

1. GENERAL ZOÖLOGY. 3. Required, sophomores. Two hours' recitation. Three hours' laboratory. A course in general principles of Zoölogy.—I. Messrs. Johnson and Stegeman.

2. FISH AND GAME. 3. Elective. Two hours' lecture. Three hours' laboratory or field. A course devoted primarily to a study of the general relations of fish, game, fur-bearing and other forest animals to forestry,



emphasizing the administrative, economic and social aspects of the problem. Prerequisite: Zoölogy 1 or equivalent and Entomology 1.—II. Messrs. Johnson and Stegeman.

3. ECOLOGY OF FRESH WATER ANIMALS. 3. Elective. Two hours' lecture. Three hours' laboratory or field. This course is intended to give a scientific foundation for the application of animal ecology to the aquatic life of the lakes and streams of forest lands and parks.—II.

4. INVERTEBRATE ZOÖLOGY. 3. The biology and classification of the invertebrate animals, designed to furnish a foundation for the understanding of the lower animals forming part of the forest community. Prerequisite: Zoölogy 1.—I and II. Mr. Mueller.

7. MAMMALS. 3. Covering the classification and natural history of the mammals of North America. Prerequisite: Zoölogy 1.—II. Messrs. Johnson and Stegeman.

11. PROBLEMS IN FOREST ZOÖLOGY. Elective; hours to be arranged. Individual study of special forest zoölogy problems. Prerequisites: Zoölogy 1, and 2 or 7.—I and II. Messrs. Johnson and Mueller.

21. ECOLOGICAL RESEARCH IN FOREST ZOÖLOGY. Elective. For graduate students.—I and II. Mr. Johnson and Staff.

## Courses for Students in the College of Forestry Given by Accessory Instructors

These courses are given by departments in the Colleges of Liberal Arts, Applied Science and Fine Arts of the University.

### BOTANY

1. RANGE AND GRAZING. 2. Elective. Two hours. Lectures, assigned reading and conference upon range and grazing problems.—II. Mr. Bray. Prerequisites: Forest Botany 1 and 2.

### ECONOMICS

1. THE ELEMENTARY PRINCIPLES OF ECONOMICS IN THEIR RELATION TO FORESTRY. 3. Three hours' lecture. This course will present those elementary principles and economic science which are essential as an introduction to a more specialized course in forest economics. Lectures, recitations, readings and reports.—I. Mr. Crafer.

5. BUSINESS LAW. 3. Three hours' lecture. A general survey of subjects more closely connected with the ordinary transaction of business.—I.

### FRENCH

10. FRESHMAN FRENCH. 3. For those offering one, two or three years of French for entrance.—I and II.

### GEOLOGY

2. GENERAL GEOLOGY FOR FORESTRY STUDENTS. 3. I. Mr. C. L. Foster.

## SOILS

1. SOILS. 3. Two hours' lecture, three hours' laboratory or field. A general course including the origin, composition, classification and distribution of soils; their physical, chemical and biological properties and activities and the relation of these to plant growth.—II. Mr. H. R. Adams.

## GERMAN

1. ELEMENTARY COURSE. 3. A course in elementary German, three recitations a week. Required, freshman.—I and II. Mr. Copeland.

3. INTERMEDIATE COURSE. 3. A course designed for those offering two years of German for entrance.—I and II. Mr. Copeland.

6. SCIENTIFIC GERMAN. 3. The reading of works of scientific nature in German. Open only to those offering three years of German for entrance.—I and II. Mr. Kullmer.

## MATHEMATICS

1. TRIGONOMETRY. 3. The solution of triangles with and without logarithms, including the derivation of the necessary formulae; the study of trigonometric functions as functions; the derivation and application of formulae involving the functions of one or more angles; the transformation of expression involving the functions; the solution of trigonometric equations.—I. Staff of Mathematics' department.

## PHYSICS

1. GENERAL PHYSICS. 4. Required of Paper and Pulp students. Three recitation hours, three hours' laboratory.—I and II. Mr. Porter. Prerequisites: Entrance Physics, or Course 4 of the department of Physics and Trigonometry.

5. GENERAL PHYSICS. 3. Two hours' lecture, one hour recitation. This course is required of all sophomores except those in the Paper and Pulp and Landscape Engineering groups. Three hours' laboratory required of all students who have not had Physics in High School.—I and II. Mr. Porter.

## SPEECH

14. ESSENTIALS. 2. A basic course designed to promote knowledge of, and proficiency in, speech. Attention to conversational delivery. Required of seniors who have not had course 15 or its equivalent.—II. Mr. Cortright.

15. ESSENTIALS. 3. A basic course designed to promote knowledge of, and proficiency in, speech. Special attention is given to observation and study of speakers. Class discussion emphasized. Study of the audience, sources of materials, methods of preparation and delivery, various speech types, and effective presentation. Text book, written and oral reports, maximum of speaking practice. Required of juniors in Pulp and Paper Course.—I. Mr. Cortright.

Those desiring further speech training may elect courses in the College of Liberal Arts. Professor Kennedy in charge.

In May, 1919, the Legislature of New York passed a bill instructing the trustees of The New York State College of Forestry to establish the Roosevelt Wild Life Forest Experiment Station. This station was created as a memorial to Theodore Roosevelt for his services in behalf of wild life. The duties of the Station are, as defined by the New York law, as follows:

"To establish and conduct an experimental station to be known as 'Roosevelt Wild Life Forest Experiment Station' in which there shall be maintained records of the results of the experiments and investigations made and research work accomplished; also a library of works, publications, papers and data having to do with wild life together with means for practical illustration and demonstration, which library shall, at all reasonable hours, be open to the public."

Furthermore, the duties of the Station are to make "investigations, experiments and research in relation to the habits, life histories, methods of propagation and management of fish, birds, game, and food and fur-bearing animals and forest wild life."

The Station continues the survey of the wild life of forest lands and waters which the College has been conducting since 1912. Investigations have been made covering such topics as the fish, fish food and fish parasites of various inland waters of the State; the relation of birds to the Northern and Western parts of the Adirondack forest; the birds of the Palisades Interstate and Allegany State Parks, and of the Central New York Marshes; also the natural history and economic relations of important New York State mammals such as the beaver, the muskrat and the red squirrel. In addition to these publications and others not here mentioned, which have appeared in the *Roosevelt Wild Life Bulletin* and *Roosevelt Wild Life Annals* to date, the results of more recent work covering various phases of wild life are being prepared for publication and will appear in due time.

Volume 5 of the *Bulletin* and Volume 2 of the *Annals* are now being printed. The editions are limited and do not admit of general free distribution. Exchanges are invited. Address all communications regarding these publications to the Director of the Station.



# THE ROOSEVELT WILD LIFE FOREST EXPERIMENT STATION

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\_\_\_\_\_, Dean  
Honorary Advisory Council of the  
Roosevelt Wild Life Station

## AMERICAN MEMBERS

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VISCOUNT GREY .....*Fallodon, England*

## PERMANENT STAFF

Charles Eugene Johnson, A.M., Ph.D., *Director*  
Wilford A. Dence, B.S., *Assistant Director*  
Miriam S. Mockford, *Secretary.*

(In addition to the permanent staff the Station maintains a staff of temporary appointments: Scientists who are engaged for the investigation of special problems.)





BULLETIN

OF

The New York State  
College of Forestry

AT

SYRACUSE UNIVERSITY

HUGH P. BAKER, Dean

*Announcement of Courses*



1931 - 1932

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# CALENDAR

1931 — 1932

1931

July 6–Sept. 14.. *Monday–Monday*—Sophomore Summer Camp  
Sept. 19–Sept. 22.. *Saturday–Tuesday* — Health Examinations  
Sept. 21–Sept. 24.. *Monday–Thursday* — Registration  
Sept. 21–Sept. 26.. *Monday–Saturday* — Freshman Week  
Sept. 25..... *Friday*, 8 *A. M.* — Classes begin in all colleges  
Nov. 10..... *Tuesday*, 9 *A. M.* — Meeting of Trustees  
Nov. 16..... *Monday* — Middle of First Semester  
Nov. 25–Nov. 30.. *Wednesday*, 11 *A. M.*–*Monday*, 8 *A. M.*— Thanksgiving Vacation  
Dec. 19–Jan. 4.. *Saturday*, 11 *A. M.*–*Monday*, 8 *A. M.*— Christmas Vacation

1932

Jan. 25–Feb. 1.. *Monday–Monday* — Mid-year Examinations  
Feb. 3..... *Wednesday* — First Semester ends  
Feb. 4–Feb. 6.. *Thursday–Saturday* — Registration  
Feb. 8..... *Monday*, 8 *A. M.* — Classes begin in all colleges  
Mar. 28..... *Monday* — Middle of Second Semester  
April 2–April 11.. *Saturday*, 11 *A. M.*–*Monday*, 8 *A. M.*— Spring Vacation  
May 25–June 1.. *Wednesday–Wednesday* — Final Examinations  
June 3..... *Friday*, 9 *A. M.* — Annual Meeting of Trustees  
June 4..... *Saturday* — Meeting of Alumni Association  
June 5..... *Sunday*, 10:30 *A. M.* — Baccalaureate Service, Gymnasium  
June 6..... *Monday*, 10:00 *A. M.* — Commencement, Gymnasium

TRUSTEES OF THE NEW YORK STATE  
COLLEGE OF FORESTRY

Ex-Officio

DR. CHARLES WESLEY FLINT . . . . .	Syracuse, N. Y.
<i>Chancellor of Syracuse University</i>	
DR. FRANK P. GRAVES . . . . .	Albany, N. Y.
<i>Commissioner of Education</i>	
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HON. HENRY MORGENTHAU, JR. . . . .	Albany, N. Y.
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HON. CHARLES A. UPSON . . . . .	Lockport, N. Y.

Officers of Board

President	Vice-President
ALFRED E. SMITH	JOHN R. CLANCY





# FACULTY OF THE NEW YORK STATE COLLEGE OF FORESTRY

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HUGH P. BAKER, B.S., 1901 (Michigan State); M.F., 1904 (Yale);  
D.Oec. 1910 (University of Munich)

*Dean*

NELSON C. BROWN, A.B., 1906; M.F., 1908 (Yale)

*Professor of Forest Utilization*

HARRY P. BROWN, A.B., 1909; A.M., 1910; PH.D., 1914 (Cornell)

*Professor of Wood Technology*

HENRY R. FRANCIS, B.S., 1910 (Massachusetts Agricultural College)

*Professor of Forest Recreation*

JAMES F. DUBUAR, A.B., 1914; M.F., 1915 (Michigan)

*Professor of Forestry, Director, New York State Ranger School*

LAURIE D. COX, A.B., 1903 (Acadia College); S.B. in Landscape  
Architecture, 1908 (Harvard)

*Professor of Landscape Engineering*

REUBEN P. PRICHARD, B.S., 1907 (Dartmouth); M.F., 1909 (Yale)

*Professor of Silviculture*

LOUIS E. WISE, A.B., 1907; PH.D., 1911 (Columbia)

*Professor of Forest Chemistry*

CLARENCE E. LIBBY, B.S. in Chemical Engineering, 1916 (Maine)

*Professor of Pulp and Paper Manufacture*

GURTH A. WHIPPLE

*Professor of Forest Extension*

CARLYN C. DELAVAN, A.B., 1914; M.S.F., 1915 (Michigan)

*Professor of Forest Extension and Director of Summer Camp*

CHARLES E. JOHNSON, A.B., 1906; A.M., 1907; PH.D., 1912  
(Minnesota)

*Professor of Forest Zoölogy; Director Roosevelt Wild Life Station*

FRANK B. MYERS, B.S., 1913; M.F., 1914 (New York State College  
of Forestry)

*Professor of Forest Extension (Acting Director)*

- HENRY F. A. MEIER, A.B., 1912; A.M., 1913 (Indiana); PH.D., 1920 (Columbia)  
*Professor of Forest Botany*
- CARL C. FORSAITH, A.B., 1913 (Dartmouth); A.M., 1914; PH.D., 1917 (Harvard)  
*Professor of Timber Physics*
- JOSEPH S. ILLICK, A.B., 1907 (Lafayette); B.F., 1911; F.E., 1913 (Biltmore); M.S., 1925 (Juniata); D.Sc., 1927 (Lafayette)  
*Professor and Special Lecturer in Silviculture*
- EDWARD F. MCCARTHY, B.S., 1911; M.S., 1916 (Michigan)  
*Professor of Silviculture*
- HIRAM L. HENDERSON, A.B., 1915 (Michigan)  
*Assistant Professor of Forest Utilization*
- HAROLD C. BELYEA, A.B., 1908; A.M., 1911 (Mount Allison); B. Sc.F., 1911 (New Brunswick); M.F., 1916 (Yale)  
*Assistant Professor of Forest Engineering*
- ALAN F. ARNOLD (Landscape Architecture, Harvard, 1904-08)  
*Assistant Professor of Landscape Engineering*
- RAYMOND J. HOYLE, B.S., 1917 (New York State College of Forestry); M.S., 1930 (Syracuse)  
*Assistant Professor of Forest Utilization*
- ROSS A. WILLIAMS, B.S.F., 1921 (Montana); M.F., 1923 (Yale)  
*Assistant Professor of Forestry, Ranger School*
- LAURANCE LEE, A.B., 1915; M.F., 1919 (Yale); M.A., 1931 (Syracuse)  
*Assistant Professor of English; Registrar*
- RAY R. HIRT, B.S., 1917 (Hamline University); M.S., 1924; PH.D., 1928 (New York State College of Forestry)  
*Assistant Professor of Forest Botany*
- CLIFFORD H. FOSTER, B.S., 1921; M.S., 1922 (New York State College of Forestry); M.F., 1923 (Harvard)  
*Assistant Professor; Director, Pack Demonstration Forest*
- SVEND HEIBERG, A.B., 1921; M.Sc.F., 1924 (Copenhagen); M.F., 1927 (Yale)  
*Assistant Professor of Silviculture*
- WILFORD A. DENCE, B.S., 1919 (New York State College of Forestry)  
*Assistant Professor, Assistant Director, Roosevelt Wild Life Station*

JUSTUS F. MUELLER, A.B., 1923 (Hopkins); A.M., 1926; Ph.D., 1928 (Illinois)

*Assistant Professor of Forest Zoölogy*

C. EUGENE FARNSWORTH, B.S.F., 1926 (Iowa); M.F., 1928 (Yale)

*Assistant Professor Ranger School*

FLOYD C. PETERSON, B.S., 1924; M.S., 1925 (New York State College of Forestry)

*Instructor in Pulp and Paper Manufacture*

AUBREY H. MACANDREWS, B.S., 1925; M.S., 1926 (New York State College of Forestry)

*Instructor in Forest Entomology*

WILLIAM M. HARLOW, B.S., 1925; M.S., 1926; Ph.D., 1928 (New York State College of Forestry)

*Instructor in Wood Technology*

JOHN C. SAMMI, B.S., 1922 (California)

*Instructor in Forest Engineering*

LEROY C. STEGEMAN, B.S., 1928 (Mich. Agri. College); M.S., 1929 (University of Michigan)

*Instructor in Forest Zoölogy*

P. J. HADDOCK, 1926 (Ranger School)

*Instructor Ranger School*

J. OSCAR BLEW, JR., B.S., 1927 (New York State College of Forestry)

*Instructor in Wood Utilization*

FLOYD E. CARLSON, B.S.F., 1928; M.F., 1930 (University of Washington)

*Instructor in Forest Extension*

STERLING R. WAGNER, B.S., 1927; M.L.E., 1930 (New York State College of Forestry)

*Instructor in Landscape Engineering*

ORRIN L. LATHAM, B.S.F., 1927 (Iowa)

*Instructor Ranger School*

VERNON A. YOUNG, B.S., 1922 (Utah); M.S., 1924; Ph.D., 1929 (University of Minnesota)

*Instructor in Forest Botany*

RAY F. BOWER, B.S., 1929 (Michigan State)

*Instructor in Forest Extension*

FRED W. FLETCHER, A.B., 1927 (Miami) ; M.A., 1929 (Ohio State)

*Instructor in Forest Entomology*

WALTER W. CHIPMAN, B.S., 1893 ; A.M., 1904 (Wabash)

*Treasurer*

ELEANOR CHURCH, B.L.E., 1916 (Syracuse)

*Librarian*

# THE NEW YORK STATE COLLEGE OF FORESTRY

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The New York State College of Forestry at Syracuse University was created in 1911 by the Legislature of the State of New York. The College is obligated to undertake such special research and state-wide investigation in forestry as will throw light upon and help in the solution of forestry problems which confront the State and the people of New York, and to serve as the State institution for research, public and student educational work in forestry.

## Location of the College and Facilities for Instruction

In 1913 an appropriation of \$250,000 was made for a forestry building to be located on the campus of Syracuse University. The building was completed and ready for occupancy at the beginning of the second semester in the college year 1916-1917, and is one of the best and most effectively equipped buildings for forestry instruction in the United States.

The Legislature of 1930 appropriated \$600,000 for a new forestry science building which will be located on the Syracuse campus near the present college building. Construction is now underway.

The location of the New York State College of Forestry at Syracuse is particularly advantageous for carrying out the professional training of students and state-wide education. From the city of Syracuse the Adirondacks and all sections of New York State are easily accessible by railroads, electric lines and highways. The central location opens conveniently a vast area to field work by the students.

The College is well equipped with apparatus for laboratory work in Utilization, Forest Botany, Pathology, Dendrology, Wood Technology, Zoölogy, Entomology and Paper Pulp experimentation, and with instruments for field work in Forest Mensuration and Surveying.

Excellent library facilities are afforded by the special forest library maintained by the College which includes the most important literature in all languages covering all phases of forestry and the sciences having a bearing on forestry. Additional library facilities are furnished by the main library of Syracuse University and the Public Library of the city of Syracuse.

## Plan and Scope of Instruction

Undergraduate instruction comprises the following:

The training of professional foresters for positions in the Federal and State Forest Services, or as experts for private forest work of any

kind. In addition to this training provision is also made for specialization in Forestry, Lumbering, Forest Utilization, Forest Management, Forest Chemistry, Forest Entomology, Forest Recreation and Park Engineering, Forest Pathology and Forest Zoölogy.

A special undergraduate course in Paper and Pulp making is offered. Complete information about this course is available in a special descriptive circular which may be obtained on application to the College.

Students of the University are accepted in courses in which they are particularly interested if prepared to carry the course.

### **Provision for Graduate Work**

The continued advancement in forestry requires a firmer scientific basis. The College acknowledges its responsibility to train men to qualify themselves as competent to carry on independent investigations in the various phases of scientific forestry and in the allied sciences. Further information regarding graduate work will be found on page 18.

### **Training in the State Ranger School**

The New York State Ranger School gives a practical course of one year which trains men for such positions as forest guard, forest ranger, tree planting expert and nursery foreman. The work is largely of a practical, intensive, nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of various methods of logging and lumbering and nursery practice and tree planting.

It is to be understood that this practical training is not an education in Forestry and that upon completion of the course a man will not be a trained forester. A certificate is given after completion of a year of satisfactory work in the school. A special bulletin of the Ranger School will be sent upon application to the Director, New York State Ranger School, Wanakena, N. Y. The course begins in April and ends in March.

### **Public Service in Forestry**

This consists of:

Instruction and advice by means of lectures, motion pictures, magazine, press articles and correspondence.

Giving of expert advice to individuals on forestry problems.

Issuing technical bulletins and leaflets embodying results of research and investigation in forestry; informative publications for popular consumption.

Special service to producers and consumers of forest products through special market investigations and studies of closer utilization of waste material.



## Special Facilities for Field Work

The College is well equipped with facilities for the essential field work needed by all foresters. The properties available are:

### THE SYRACUSE FOREST STATION

This Station is located in the southern part of the city of Syracuse, and consists of a total area of ninety acres made up of two farms purchased and consolidated in the spring of 1912. Since 1912 experimental work has been conducted on the area. The experimental nursery operated by the College is located on this tract. A woodlot of 30 acres is also located here and is utilized for demonstration purposes.

### THE SALAMANCA FOREST STATION

This tract, acquired in 1912, consists of 1,016 acres and is located south of Salamanca in Cattaraugus County adjacent to the Allegany State Park. The forest on this area is a mixed stand of hardwoods consisting of aspen, chestnut, oak and maple. Experimental thinnings have been made and several plantations established in the open portions of the tract. A plan of management has been prepared.

### THE RANGER SCHOOL FOREST

In 1912 the Rich Lumber Company, of Wanakena, N. Y., presented to Syracuse University for use by the New York State College of Forestry for forestry purposes a tract of 1,850 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks near Wanakena, St. Lawrence County. In December, 1929, The International Paper Company gave an adjoining tract of 500 acres to be added to this forest making the total area of 2,350 acres. A forest management plan is being prepared for this station. The area is typical of the cut-over land found in northern New York and is well suited for forestry work. The College Forest is used principally by the students of the State Ranger School at Wanakena. A branch U. S. Weather Station has been established here. An excellent opportunity for research and experimental work is afforded by the facilities found on this area.

### THE CHARLES LATHROP PACK EXPERIMENTAL FOREST

In 1923 Charles Lathrop Pack presented to Syracuse University for the use of the New York State College of Forestry, a tract of 1,000 acres, situated on Cranberry Lake, known as the "Barber" tract and on which, since 1915, the College of Forestry Summer Camp has been

held. This area serves as a laboratory for the students and is a permanent camp where 10 weeks' practical experience in field methods is given to sophomores each summer. Adjoining this tract and available for field demonstration are State lands included within the Adirondack Park.

## THE CHARLES LATHROP PACK DEMONSTRATION FOREST

In the spring of 1927 an area of 2,250 acres was presented by the Charles Lathrop Pack Forestry Trust to Syracuse University for the use of the New York State College of Forestry. This Forest is in the Lake George-Warrensburg region and is located about 3 miles north of Warrensburg on the main highway between New York City and Montreal. Management plans have been formulated to demonstrate on this area the practicability of the practice of forestry. The forest also serves as a field laboratory for the study of silviculture and other forest problems.

### SHORT COURSE

A special short-course covering instruction in kiln drying is given annually at the College. This synoptical course is designed primarily for men actively engaged in the industry.

Requests for detailed information of this course should be addressed to the Dean.

### Publications

From time to time the College issues technical publications, bulletins and leaflets on various forestry subjects and problems. A list of such publications will be sent free on application. Most of the publications so listed are for free distribution, while for others a small charge is made.

The News Letter is published quarterly by the College and carries items on the work of the College, news of its Alumni and information of general interest to foresters.

The News Letter is distributed without charge.

Applications for publications should be addressed to the Director of Forest Extension, New York State College of Forestry, Syracuse University, Syracuse, N. Y.

### Communications

All general correspondence should be addressed to the Dean; inquiries and correspondence concerning entrance should be addressed to the Registrar of the New York State College of Forestry, Syracuse University, Syracuse, N. Y.

# GENERAL INFORMATION

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## Expenses

All bills *except* those for dormitory rooms and board are payable to W. W. Chipman, Treasurer, New York State College of Forestry, Syracuse, N. Y. Checks should be drawn payable to W. W. Chipman, Treasurer.

Payments for dormitory rooms and board are due Syracuse University and such checks should be drawn payable to Treasurer of Syracuse University.

### • MATRICULATION

Every student on entering the University is required to pay a matriculation fee of \$10.00. This fee is not required of students passing from one college to another within the University nor of students transferring from another institution if evidence is submitted that such a fee was paid in the former institution. All students entering graduate work pay a matriculation fee of \$10.00.

### FEES

All fees for instruction and incidentals are payable twice a year, on or before the first day of each semester. The treasurer's receipt admits to classes.

Students who for at least twelve months prior to entering the College, have been bona fide residents of the State of New York are exempt from payment of tuition; provided, however, that no student shall be allowed to transfer from the College of Forestry to another college in Syracuse University wherein tuition is charged without first paying \$7.00 per hour for the hours for which he may receive credit in the latter college, with the understanding that from the above amount shall be deducted whatever amount has been collected and retained by the College of Forestry for tuition and fees.

Tuition per year (non-residents).....	\$200.00
Matriculation (paid once).....	10.00
Sophomore Summer Camp (paid once) not including board..	25.00
Library Deposit (returnable) .....	5.00

### PER SEMESTER

General Fee, first semester.....	30.00
†General Fee, second semester.....	15.00
Student Activities .....	2.75

† The General Fee for the second semester for students not in attendance the first semester will be \$22.50.

Student Loan Fund and Alumni Association (Sophomore year only) .....	\$1.00
Laboratory Fees (all undergraduates) .....	20.00
Laboratory Fees (graduates).....	25.00
Paper and Pulp students \$10 per semester in addition to regular fee beginning first semester sophomore year.	
Diploma Fee (paid at time of graduation).....	10.00

### DORMITORIES

All bills covering residence in dormitories are payable at the office of the University Treasurer. Checks should be drawn payable to Syracuse University. In case payment is not made within two weeks of the time it is due, the student is automatically suspended.

An advance deposit of \$10.00 must be paid by each student when room is engaged or reserved, which will be credited upon the first term's bill and will be refunded in case the student does not become or remain a student in the University, provided the room is given up before September 1.

Rental for room is payable one-half at the beginning of each semester, and no refund is made unless substitute is obtained acceptable to the University. Board is payable quarterly in advance on or before September 20, November 20, February 1, April 1. If a student for good and sufficient reasons is obliged to leave the University, the portion of board unused will be refunded.

Students may re-engage rooms occupied by them for the following year provided that applications are made prior to April 1, but such rooms will not be held longer than May 15 unless contracts are signed and deposits paid by that date.

Furniture and bed linen are supplied by the University; students must supply their own towels, curtains, rugs and pictures.

Board and room in Sims Hall is \$400 a year, including heat and light. Men wishing information on Sims Hall should address Men's Personnel Office, Syracuse University, Syracuse, N. Y.

Men students not in the dormitory or chapter houses must live in houses approved by the University. A list will be sent on request from the Men's Personnel Office. On arrival the student should be sure that he is in an approved house by demanding to see the "Certificate of Approval." This will avoid the necessity of moving at a later date. Students are urged to reserve rooms before September 1. For any information regarding the living conditions, address Men's Personnel Office.

### SELF-SUPPORT

Many students attend Syracuse University who earn all or a part of their expenses. The earning of board and lodging is not an extremely difficult matter. Only the most brilliant students, however, can expect to earn their total expenses and maintain satisfactory grades.

The Appointment Office in the Administration Building of Syracuse University assists students in securing self-support work. Prospective students may write to the Appointment Office stating the type of work they would like to secure and stating the experience they have had in this work.

### THE CHARLES LATHROP PACK PRIZE

The Charles Lathrop Pack Foundation was established in 1923 by Charles Lathrop Pack, President of the American Tree Association, to encourage students in educational institutions in arousing public interest in forestry and to advance forestry education among the people. A prize of \$100 from the foundation is presented annually to the student of the New York State College of Forestry selected by the judges as most worthy of such recognition. An essay-speaking contest in the second semester is held for this purpose.

### THE BOY SCOUT SCHOLARSHIP

Through arrangements made with the National Headquarters of the Boy Scouts of America, the College awards each year a scholarship equal to \$100 in value to the Boy Scout in the State of New York who is considered most worthy of this honor. A Scout who desires to become an applicant for the scholarship should secure an application blank from the Registrar of the College, fill in the blank, and then return the application to the Registrar properly endorsed by the Council Executive. The application will then be recorded and sent to the Regional Director of Scouts for his recommendations. The Scout will be notified by the College of the result of his application. The Scout's scholastic record should accompany the application.

In order to retain a scout scholarship an average for all work of 75% is required.

### PHYSICAL TRAINING

Good health is necessary to attain high scholarship in college and to perform successfully the duties of later life. With this end in view considerable stress is laid upon well-regulated physical training. Every undergraduate student in the College of Forestry is required to take systematic exercise, including swimming in the gymnasium, during the first year of the course unless physically unable to engage in it.

A medical examination is given every student when he enters upon gymnasium work and his exercises are adapted to the requirements of his health and to the development of a sound body.

The athletic interests of the University are in the hands of the Athletic Association. All business is transacted through the Athletic Governing Board, which includes representatives from the faculty, alumni, students, and interested business men of the city.



## REQUIREMENTS FOR ADMISSION

Students entering the regular course leading to a degree must offer 15 units of preparatory work of high school grade. A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. Two to three hours of laboratory, drawing or shop work count as equivalent to one hour of recitation. No candidate is eligible for admission if deficient in more than 1 count of entrance conditions. Applicants for admission to the New York State College of Forestry must have completed the following subjects with a *general average of 75% for school grades, or a general average of 70% for Regents grades:*

	<i>Units</i>
English (four years) .....	3
History (Ancient, Medieval, English, American, or Modern)....	1
Mathematics .....	2½
(All applicants must have completed courses in elementary algebra and plane geometry; the extra ½ unit may be made up by offering a half year's credit in Solid Geometry, Trigonometry, or Intermediate Algebra.)	
Language (Latin, French, German, or Spanish).....	2
Science .....	1
Elective .....	5½
(Elective units may be offered for extra courses in the subjects listed above; or in Freehand and Mechanical Drawing; Carpenter Shop or Foundry; Economics; Agriculture. Credit cannot be granted for purely commercial subjects like stenography or typewriting, commercial arithmetic, or business writing.)	
Total .....	15

Applicants for admission to the New York State College of Forestry who show a high scholarship rating in their high school work may be given special consideration with regard to the substitution of other subjects for the specific subjects required for entrance.

The College in maintaining a high standard of work believes that satisfactory college work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of forestry and that there is no short cut to the profession. The College urges every young man who is considering the study of forestry to make up his mind to spend all the time necessary for thorough preparation for college work.

Freshmen are accepted *only* at the beginning of the fall semester. There is no opportunity to enter at midyear except on advanced standing from some other college.



# **UNDERGRADUATE WORK IN THE COLLEGE OF FORESTRY**

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## **I. The Four Year Course in General Forestry Leading to the Degree of Bachelor of Science**

This is essentially a general college course in which the student studies forestry as his major subject. He should realize that it must necessarily fall short of the measure of special training necessary for the professional forestry degree. It is designed for students who desire a somewhat intimate knowledge of various branches of forestry for the general satisfaction which such knowledge gives, or for the use they can make of it in a practical way; for those who wish to prepare themselves to teach certain aspects of forestry in the public schools; or for those who after their college course wish to take subordinate positions in lumbering or manufacturing of forest products or subordinate positions in state or national forest service. Such students will not be entitled to the designation of professional foresters merely upon the completion of the four years' course.

## **II. The Four Year Course in Pulp and Paper Manufacture Leading to the Degree of Bachelor of Science**

This course has been established to fill the increasing demand for technical men in the important field of utilization included by the pulp and paper industry. The curriculum of the first year is identical with the general forestry course giving the student the opportunity of determining his future work at the College. The last three years of the course are largely devoted to chemistry, physics, engineering and the technical phases of pulp and paper manufacture. Upon satisfactory completion of the four year program the student should be qualified to enter the pulp and paper industry as a mill control chemist, a technologist in forest products or an operating mill executive.

## **III. The Four Year Course in Forest Recreation and Park Engineering Leading to the Degree of Bachelor of Science**

The rapidly increasing use of the forests for recreation necessitates the training of men for this service. The course gives special attention to the considerations of fitting men to go into this field of forestry and to be of larger service in developing those phases of work which have to do directly or indirectly with any of the many and diverse uses of forests for recreation.

The objects of this course are two-fold. In the first place it is to prepare men for rendering services in connection with the provision of

facilities for forest recreation and the management of forest areas that contain such utilities with emphasis on camping technique. Secondly, it aims to equip men with an appreciation of the technique of landscape engineering and the growing of trees for their aesthetic value, just as the growing of trees for their commercial value is the problem of technical forestry.

In addition the course aims to supply the constantly increasing demand of states, cities and towns for men with the expert scientific knowledge of the forester and engineer and the artistic appreciation of the landscape architect, to care for the trees on their streets, parkways and boulevards or administer their parks and reservations. Upon graduation, students should be qualified to act as assistants to city foresters, park superintendents or landscape engineers or to act as construction or planting superintendents upon any form of landscape or park work or as draftsmen or designers in landscape, park or city planning organizations.

#### **IV. The Five Year Professional Course Leading to the Degree of Master of Forestry**

This course is designed to prepare professional foresters for higher positions of responsibility in the state service, the national forest service and for the position of expert forester for private concerns. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man must of necessity build his professional training upon a foundation of general culture. It is the unanimous opinion of the leaders in forestry education and in the development of forestry policy in this country, that men who expect to follow the profession of forestry act unwisely if they try to make a short cut by eliminating the foundation training. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting the full measure of time advised for preparation. It is advised that every man who takes the four year undergraduate course in the College will go on and complete his fifth year either immediately following the fourth year or after a year or two of practical work.

The fifth year of this five year course is in reality graduate work and subject to the rules governing graduate work in the College of Forestry.

#### **V. Graduate Work**

Graduate work in the College has been planned with the purpose of training two different types of men—first, the man with a more complete, broad, general training in forestry and, second, the specialist, capable of investigating special economic and scientific problems of forestry. The broad, general training is designed to train men as administrators of state, national or private forest or parks. The large

opportunities awaiting thoroughly trained foresters fully justify them in devoting at least five years of study and preparation. For this reason it is strongly urged that students who have shown proper ability in the four year course in the College return and complete a fifth year either immediately following the fourth year or after a year or two of practical work. This five year course leads to the degree of Master of Forestry.

There are a vast number of technical and scientific problems which must be investigated before forestry really comes into its own in this country and such problems can be solved only by the man who has been specially trained in methods of investigation and who is thoroughly conversant with the research in his own field. The College of Forestry is offering graduate work in all phases of scientific forestry such as silviculture, wood technology, forest pathology, forest entomology, forest zoölogy, forest chemistry, etc.

The graduate work is open not only to graduates of forestry courses but under certain restrictions, mentioned in another place, to men whose undergraduate work has been along other scientific lines. Two degrees are open to men taking such work: Master of Science and Doctor of Philosophy.

## **Rules Governing Graduate Work in the College of Forestry**

### **DEGREES OFFERED**

The following degrees will be conferred upon the satisfactory completion of approved schedules of courses and of the other requirements:

Master of Forestry, Master of Science and Doctor of Philosophy.

It should be understood that the time requirements mentioned below are minimum requirements only. The College does not obligate itself to grant degrees, except upon the completion of all the work in a manner satisfactory to its faculty. The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.

### **MAJORS AND MINORS**

At the time of enrolling, the candidate for a degree shall submit a schedule consisting of not more than 15 semester hours in each semester. This schedule shall be distributed between a major of nine semester hours and two minors of three semester hours each. If so desired, both the major and one minor may be taken in one department or both minors may be taken in one department. This schedule must receive the approval of the graduate committee and the Dean.

### **REQUIREMENTS FOR THE DEGREE OF MASTER OF FORESTRY**

For candidates who are graduates of approved courses in technical forestry a minimum of one year of residence work is required. For

graduates in other courses a minimum of two years' residence work will be necessary.

A thesis or report showing the candidate's ability to complete satisfactorily an investigation upon a topic connected with the candidate's major study must be submitted to the professor in charge not later than May 1st of the year in which the candidate receives his degree. This, if approved by the professor in charge, and if acceptable to the graduate committee is so endorsed and a copy is deposited in the library.

Upon the acceptance of his thesis the candidate will be notified and provided he has satisfactorily passed written examinations in all his courses he will at the same time be instructed when to appear for an oral examination. This examination will be given by the professors under whom the candidate's work has been taken—the Dean or some member of the graduate committee acting as chairman. Any member of the faculty is privileged to be present. This examination will not take place later than June 1st.

### REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

For students who are graduates in forestry of this institution or others of a similar grade, a minimum of one year of residence work of an acceptable grade is desired.

Students who are graduates in lines other than forestry may be recommended for their degree on the completion of one year of satisfactory residence work provided he has taken at least one minor in forestry. *The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.*

Similar requirements are made as regards thesis and oral examinations as for the preceding two degrees.

### REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

A candidate must be a graduate of a college of approved standing and his undergraduate standing must have been such as to fit him to pursue advanced work in the subject which he chooses as his major. Before beginning the second year of graduate work the candidate must demonstrate his ability to read scientific German and French at sight.

In case the candidate holds merely the bachelor's degree a minimum of three years' graduate work is required. One year's residence in graduate work at another college may be substituted with the approval of the Dean and graduate committee.

At the time of enrolling, the candidate must choose the major study and two minor studies subject to the same rules as those governing



other graduate work. If the candidate is not a graduate in forestry at least one of these minors during two years of his course must be in forestry.

A thesis demonstrating the results of scientific research upon a topic bearing upon his major subject must be completed and receive the approval of the major professor not later than May 1st of the year in which the degree is granted. This must be satisfactory to the Dean and graduate committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the College library.

The candidate is required to pass two examinations, both oral. The preliminary examination will be upon the subjects covered by his major and minors. The final examination will be upon the candidate's thesis.

#### GROUP ELECTIVE SYSTEM—

In September, 1924, a new system of election known as the *Group Elective System* went into effect. By this system the student will, at the proper place in his course, elect his work in one of the following eight groups:

- I. Silviculture and Management.
- II. Forest Protection.
- III. Forest Utilization.
- IV. Forest Zoölogy.
- V. Wood Technology—Chemistry.
- VI. Forest Recreation and Park Engineering.
- VII. Pulp and Paper Manufacture.

The students electing the Pulp and Paper course will take the freshman year as prescribed and start this special work at the beginning of the sophomore year—taking the program of subjects as prescribed in Group VI.

All other students of the College will complete the freshmen and sophomore years and the Sophomore Summer Camp. With the beginning of the junior year they will elect one of the five remaining groups.

Student electing Groups I and II and all students in other groups who have elected the course in Silviculture IV and Engineering XI are required to attend the Senior Camp. This will be in session during the month of May of the senior year and will be devoted to field work in Silviculture and Management.

### Program of Courses FRESHMAN YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Chemistry 1	4	Chemistry 1	4
Botany 1	3	Botany 2	3
English 1	3	English 1	3
General Forestry 1	1	Engineering 1	4
Mathematics 1	3	Mechanical Drawing 3	2
Drawing 1	1		
Mechanical Drawing 2	1		16
	16		

### SOPHOMORE YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Botany 3	3	Botany 4	3
English 4	2	English 4	2
Zoology 1	3	Entomology 1	3
Engineering 2	3	Engineering 3	3
Physics 5	3	Physics 5	3
Wood Technology 1	4	Wood Technology 1	4
	18		18

SOPHOMORE SUMMER CAMP ON CRANBERRY LAKE IN THE ADIRONDACKS, 10 weeks beginning middle of June. Required of all students in Forestry. Prerequisites: Engineering 1, 2, and 3. Instruction by members of the various departments. No junior who has not had the prescribed engineering at the summer camp will be permitted to take Engineering 14. All men attending the camp are required to be able to swim.

### GROUP I—SILVICULTURE AND MANAGEMENT GROUP JUNIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
English 5	2	Engineering 14	3
Entomology 2	3	Gen. Forestry 10	
Geology 2	3	Silviculture 3	3
Silviculture 1	3	Silviculture 4	3
Utilization 1	3	Soils 1	3
Wood Technology 3	3	Utilization 2	3
	17		17

### SENIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Botany 12	3	Engineering 4	3
Engineering 11	3	General Forestry 2	3
Engineering 15	2	Gen. Forestry 5	2
Engineering 16	3	Speech 14	2
Gen. Forestry 14	2	Utilization 4	3
Silviculture 11	2	Elective or not	4-6
Silviculture 14	2		
Elective or not	0-2		17-19
	17-19		



## FIFTH YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Botany 16	3	Botany 16	3
Engineering 21		Engineering 12	3
or Silviculture 21	3	Engineering 21	
Engineering 22	3	or Silviculture 21	3
Wood Technology 13	2	Utilization 16	3
Elective or thesis	6-8	Wood Technology 13	1
	17-19	Elective or thesis	3-6
			16-19

GROUP II—FOREST PROTECTION GROUP  
JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
English 5	2	Botany 11	
Entomology 2	3	or Entomology 12	3
Geology 2	3	Engineering 14	3
Silviculture 1	3	Gen. Forestry 2	3
Utilization 1	3	Silviculture 3	3
Wood Technology 3	3	Soils 1	3
	17	Group Requirement	2-3
			17-18

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Botany 12	3	Botany 15	
Business Law 1	2	or Entomology 13	3
Economics 1	3	Chemistry 2	
Entomology 17		or Entomology 16	3
or Chemistry 2	3	Silviculture 4	3
Gen. Forestry 14		Speech 14	2
or Utilization 17	2-3	Group Requirement	4-6
Silviculture 11	3		15-17
	16-17		

*Graduate work to be arranged in consultation between the head of the department, chairman of the Graduate Committee, and the student.*

GROUP III—FOREST UTILIZATION GROUP†  
JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Accounting 21	3	Economics 1	3
Economics 1	3	Gen. Forestry 2	3
English 5	2	Silviculture 3	3
Silviculture 1	3	Utilization 2	3
Utilization 1	3	Utilization 4	3
Wood Technology 3	3	Elective or not	
	17	(Transportation 1; required elective)	0 or 3
			15-18

† Field Lumber study (util. 5) during May instead of Senior Camp is required for graduation.

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Botany 12		Speech 14	2
or Wood Tech 13	2-3	Utilization 12	3
*Business Law 1	2	**Utilization 11	2
Utilization 6	1	**Utilization 15	3
Utilization 14	3	**Utilization 18	3
Utilization 16	3	**Wood Tech 13	1
Utilization 17	17	or recommended electives	
Elective	3	MM3 (Indust. Engr.)	2
	17-18	MM4 (Indust. Invest.)	2
		Util 21	3
			15-18

## FIFTH YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Thesis	9	Thesis	9
Transportation 4	3	Wood Technoology 13	1
Wood Technology 13	2-3	Utilization 19	2
or Botany 12	3	Elective	3
Elective	3		15
	16		

\* General University courses.

\*\* Recommended electives may be substituted.

## GROUP IV—FOREST ZOOLOGY

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
English 5 (Tech. Expos.)	2	*German 6	3
*Geology 2 (Gen. Geol.)	3	or	
*Zoology 5 (Comp. Anat.)	4	*Zoology 6 (Genetics)	3
Silviculture 1	3	Silviculture 4 (S. Systs.)	2
Entomology 2	3	*Soils	3
or		Zoology 2 (Fish & Game)	3
*German 6	3	or	
Zoology 4 (Invert. Zool.)	3	*Zoology 8 (Vert. Zool.)	4
	18	Zoology 7 (Mammals)	3
		or	
		Zoology 3 (Ecol. Fr-an.)	
		Zoology 4 (Invert Zool.)	3
			17-18

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Geology 103 (Paleontology)	3	*Geology 32 (Physiography)	3
*Zoology 12 (Histology)	4	*Psychology 1 (Gen. Psych.)	3
*Zoology 105 (Gen. Physiol.)	4	*Zoology 104 (Embryology)	4
*Geology 32 (Physiography)	3	*Geology 103 (Paleontology)	3
*Psychology 1 (Gen. Psych.)	3	Zoology 3 (Ecol. Fr-w. an.)	3
*French	3	or	
	20	Zoology 7 (Mammals)	3
		*French	3
			19

\* Indicates across campus courses.

## GROUP V—WOOD TECHNOLOGY—CHEMISTRY GROUP†

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Chemistry 2	3	Chemistry 2	3
*Physics 3	3	*Physics 3	3
*Chemistry 20	3	*Chemistry 20	3
Wood Technology 3	3	*Botany 25	3
English 5	2	*Mathematics 3	3
Silviculture 1	3	*Mathematics 5	3
	17		18

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Chemistry 130	3	*Chemistry 130	3
*Mathematics 104	3	*Mathematics 105	3
Wood Technology 13	2	Wood Technology 13	1
Chemistry 11	3	Wood Technology 12	3
Utilization 1	3	Botany 16	3
Botany 16	3	Speech 14	2
	17	Group Elective	3
			18

† Senior Camp not required for students in this group.

Graduate work to be arranged in consultation between the head of the department, Chairman of the Graduate Committee, and the student.

GROUP VI—FOREST RECREATION AND PARK  
ENGINEERING

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Silviculture 1	3	Silviculture 4	2
Entomology 3	3	Forest Zoology 2	3
Park Engineering 1	3	Park Engineering 1	3
Forest Recreation 1	3	Forest Recreation 1	3
Forest Recreation 5	3	Forest Recreation 5	3
Elective	3	Elective	3 or 4
	18		17 or 18

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Economics 1	3	Speech 14	2
Park Engineering 3	4	Park Engineering 3	4
Park Engineering 4	3	Park Engineering 4	3
Park Engineering 7	2	Park Engineering 7	2
Elective	6	Elective	6 or 7
	18		17 or 18

\* General University courses.

## SUGGESTED ELECTIVES

	1st Sem. Hrs.		2nd Sem. Hrs.
Architecture 2	3	Architecture 2	3
Geology 2	3	Soils 1	3
Geology 32	3	Silviculture 3	3
Engineering 16	3	Engineering 14	3
Physical Education 9	3	Physical Education 9	3
Psychology 5	3	Psychology 5	3
Psychology 104	3	Psychology 104	3
Education 130	3	Zoology 7	3
English 5	2	Park Engineering 2	3
Park Engineering 2	3	Park Engineering 6	3
Park Engineering 5	3	Park Engineering 8	3
Forest Recreation 3	3	Forest Recreation 4	3
Forest Recreation 6	3	Forest Recreation 7	3
Forest Recreation 7	3	Forest Recreation 8	3
Forest Recreation 8	3	Forest Recreation 16	3
Forest Recreation 15	3		

## GROUP VII—PULP AND PAPER MANUFACTURE

*Freshman Year as Prescribed*

## SOPHOMORE YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Chemistry 20, Qualitative	3	*Chemistry 20, Qualitative	3
*Physics 1	4	*Physics 1	4
English 5	3	Speech 14	2
*Math. 3 Analytics	3	*Math. 4, Dif. Calculus	3
Wood Technology 1	4	Wood Technology 1	4
	16		16

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Chemistry 130, Quantitative	3	*Chemistry 130, Quantitative	3
Forestry Chemistry 2, Organic	3	Economics 1	3
Math. 5, Int. Calculus	3	Pulp and Paper Manufacturing:	
Pulp and Paper Manufacturing:		1—Technology	3
1—Technology	3	2—Laboratory	2
2—Laboratory	2	3—Machinery	2
3—Machinery	2	5—Paper Testing	2
4—Mill Analyses	2	6—Pulp Testing	1
6—Pulp Testing	1		19
	10		

\* General University courses.

*Three Months' Summer Work in a Pulp or Paper Mill*

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Wood Technology 3	3	Business Law 1	2
*Business Law 1	2	Wood Technology 4—Fibres	3
*Heat and Power 1	3	*Mechanical Laboratory 3	1
*Electrical Machinery 5	3	*Electrical Machinery 6	3
*Electrical Laboratory 5	1	*Electrical Laboratory 6	1
Pulp and Paper Mfg.—9 Problem	1	Pulp and Paper Mfg.—10 Problem	5
Pulp and Paper Mfg.—7 Coloring	2		
Forest Chemistry 11—Cellulose	3		15
	18		

*Three Months' Work in a Pulp or Paper Mill*

\* General University courses.

## Description of Courses in the College of Forestry

Note—A numeral following the title of the course indicates the number of credit hours a week. A credit hour means one recitation (or lecture) hour per week. Three laboratory hours are equivalent to one credit hour. The Roman numeral following the description indicates the semester in which the course is given.

### Department of Forest Botany

PROFESSOR MEIER; ASSISTANT PROFESSOR HIRT; INSTRUCTOR YOUNG;  
ASSISTANT PERCIVAL.

*Courses 1, 2, 3, 4 required of undergraduates.*

*Courses 11, 12, 13, 14, 15 elective of graduates or undergraduates.*

*Course 16 for seniors or graduates.*

*Course 21 for graduates only.*

1. FOREST BOTANY. 3. Required of freshman. Two hours of lecture. Three hours of laboratory. An elementary course throughout the first year dealing with structure and functions of plants and the fundamental problems of Botany, together with a general survey of the plant kingdom.—I. Messrs. Meier, Hirt, Percival, Harris and Hopp.

2. FOREST BOTANY. 3. Required of freshman. A continuation of FOREST BOTANY 1—II. Messrs. Meier, Hirt, Percival, Harris and Hopp.

3. PLANT PHYSIOLOGY. 3. Required of sophomores. Lectures, recitations, and laboratory. A course designed to teach the fundamental physiological processes involved in growth of plants.—I. Messrs. Meier, Young and Gottlieb. Prerequisites: Courses 1 and 2.

4. SYSTEMATIC BOTANY. 3. Required of sophomores. Lectures, recitations, laboratory and field-work. A course dealing with the fundamentals of plant classification and identification.—II. Messrs. Young and Gottlieb. Prerequisites: Courses 1 and 2.

11. GENERAL MYCOLOGY. 3. Elective. One hour of lecture. Four to six hours of laboratory. A course in the structure and life histories of fungi.—II. Mr. Hirt. Prerequisites: Courses 1, 2 and 3.

12. FOREST PATHOLOGY. 3. Elective. Two hours of lecture. Three hours of laboratory. A course of lectures and laboratory work upon the diseases of plants in general with especial emphasis upon diseases of trees.—I. Mr. Hirt. Prerequisites: Courses 1, 2 and 3.

13. CULTURE METHODS. 3. Elective. Six hours of laboratory and conference. A study of technique in the isolation and pure culture of fungi.—II. Mr. Hirt. Prerequisites: Course 12.

14. ADVANCED MYCOLOGY. 3. Elective. A year course in the classification of fungi.—I. Mr. Hirt. Prerequisites: Courses 11 and 12.

15. ADVANCED FOREST PATHOLOGY. 3. Elective. One hour lecture. Six hours of laboratory.—II. Mr. Hirt. Prerequisites: Courses 11 and 12.

21 RESEARCH IN FOREST BOTANY AND PATHOLOGY. Elective for graduates.—I and II. Messrs. Bray, Meier and Hirt.

16. ADVANCED PLANT PHYSIOLOGY. 3. A year course open to seniors and graduates. A consideration of the fundamental characteristics of living matter and life processes in plants. Hours to be arranged. Mr. Meier.

## Department of Forest Chemistry

PROFESSORS WISE AND LIBBY; INSTRUCTOR PETERSON

*Courses in Forest Chemistry 2 and 11 are required of all students in Groups IV and VII. They are open to properly qualified students in Forestry. All courses in paper and pulp manufacture are required of students entering this field. Forest Chemistry 12 and 21 are open only to properly qualified graduate students.*

## Forest Chemistry

1. GENERAL INORGANIC CHEMISTRY. 4. Required of all freshmen. Given in the department of Chemistry of the College of Liberal Arts.—I and II. Mr. Norton, Mr. Elder and Instructors.

2. ORGANIC CHEMISTRY. 3. P. and P. junior required. Two hours' lecture and 3 hours' laboratory. This is primarily an elementary course in organic chemistry.—I and II. Mr. Wise. Prerequisite: Chemistry 1.

11. CHEMISTRY OF CELLULOSE. 3. P. and P. senior required. Three hours' lecture. An elementary course in the chemical and physical properties and the use of cellulose and its derivatives—I. Mr. Wise. Prerequisite: Forest Chemistry 2.

12. CHEMISTRY OF CELLULOSE. 2. Graduate elective. Two hours' lecture (or seminar). Lecture will cover researches on the constitution, properties, and uses of cellulose and its derivatives. This is essentially a graduate course.—II. Mr. Wise. Prerequisite: General Chemistry, Qualitative and Quantitative Analysis, Organic Chemistry, and a reading knowledge of German.

13. SEMINAR. 1. Elective. One hour weekly. Reports on the recent chemical literature dealing with forest products.—I and II. Mr. Wise. Prerequisite: Chemistry 3 or its equivalent.

14. ANALYSIS OF WOOD. 3. Nine hours' laboratory. Quantitative proximate analysis of sound or decayed woods—II. Mr. Wise. Prerequisites: General Chemistry, Qualitative and Quantitative Analysis, Forest Chemistry 2 and Chemistry 11.

21. RESEARCH IN FOREST CHEMISTRY. Graduate elective. Hours to be arranged. Problems in forest chemistry and organic chemistry will be assigned to properly qualified graduate students.—I and II. Mr. Wise. Prerequisites depend upon the nature of the problem.



## Pulp and Paper Manufacture

*Special bulletin describing the work of the paper and pulp course may be obtained from the Registrar of the College. This course is subject to revision from year to year.*

1. **TECHNOLOGY.** 3. P. and P. junior required. Three hours' lecture. Study of the processes employed in the manufacture of pulp and paper.—I and II. Mr. Libby. Prerequisites or parallel courses: Chemistry 20 and 130.

2. **TECHNOLOGY LABORATORY.** 2. P. and P. junior required. Six hours' laboratory. Laboratory demonstrations of the principles of pulp and paper manufacture described in Course 1.—I and II. Mr. Peterson. Prerequisite or parallel courses Pulp and Paper 1 and 3.

3. **MACHINERY.** 2. First semester and 2 second semester. P. and P. junior required. Three hours' lecture. Lectures on design, construction and operation of machinery used in the pulp and paper industry.—I and II. Mr. Peterson. Prerequisite or parallel courses: Physics 1 and P. and P. 1.

4. **MILL ANALYSIS.** 2. P. and P. junior required. Six hours' laboratory. Evaluation of materials used in the manufacture of pulp and paper.—I and II. Mr. Peterson. Prerequisite or parallel courses: Chemistry 20 and 130 and P. and P.

5. **PAPER TESTING.** 2. P. and P. junior required. Six hours' laboratory. Physical, chemical and microscopical characteristics of papers.—II. Mr. Libby. Prerequisites or parallel courses: P. and P. 4.

6. **PULP TESTING.** 1. P. and P. junior required. Three hours' laboratory. Physical and chemical properties of pulp. Oil and coal analysis.—I and II. Mr. Peterson. Prerequisites or parallel courses: P. and P. 4.

7. **COLORING.** 2. P. and P. senior required. Six hours' laboratory. Evaluation and identification of dyestuffs and the development of color formulas for dyeing pulp and paper.—I. Mr. Libby. Prerequisites or parallel courses: P. and P. 4.

9. **PROBLEM.** 1. P. and P. senior required. A report covering a systematic survey of all available literature on some problem of interest to the pulp and paper industry. I. Messrs. Wise, Libby and Peterson. Prerequisites or parallel courses: Pulp and Paper Mfg. 1 to 5. Forest Chem. 2 and 11 and Chem. 20 and 130.

10. **PROBLEM.** 4. P. and P. senior required. Laboratory development of the problem formulated in course 9.—II. Messrs. Wise, Libby and Peterson. Prerequisite: Pulp and Paper Mfg. 9.

## General Forestry

*Courses 1 and 2 are required of undergraduates, Groups I-IV.*

*Course 10 is required of seniors in Group I.*

*Course 14 is elective for seniors.*

1. GENERAL FORESTRY. 1. A series of lectures designed to acquaint first year men with the objectives of the profession of forestry.—I. Dean Baker.

2. HISTORY OF FORESTRY. 3. The development of forestry as influenced by the growth of human culture and civilization.—II. Mr. Lee.

5. FOREST SEMINAR. 2. Required. Assignment and discussion of current forestry subjects.—II. Mr. Fenska.

10. FOREST LAWS AND POLICIES. 2. Required for juniors in the Silviculture and Management group. Two hours' lecture. The object of this course is to gain knowledge of the important laws affecting the National Forests and Public Domain. The forest laws of the principal states engaged in forestry work will be studied in detail. Forest taxation, legislation, administration and state and national policies are discussed.—II. Mr. Hoyle.

14. NATIONAL FOREST PRACTICE. 2. Elective for seniors. Two hours' lecture. The creation and organization of United States Forest Service; with particular reference to the protection, administration and development of the National Forests. Lectures and reports.—I. Mr. Frank B. Myers.

## Department of Forest Engineering

PROFESSOR FENSKA; ASSISTANT PROFESSOR BELYEA;

INSTRUCTOR SAMMI

*Courses 1, 2, 3, are required of all undergraduates, and are prerequisite for Sophomore Summer Camp.*

*Summer Camp Engineering is also required.*

*Courses 11 and 12 are elective to graduates and undergraduates*

*Courses 21 and 22 are elective to graduates only.*

1. PLANE SURVEYING. 3. Required freshman. Two hours' lecture. Three hours' field work. A preliminary course in the use of surveying instruments and field methods. Mapping and office computations.—II. Messrs. Fenska and Sammi.

2. PLANE SURVEYING. 3. Required sophomore. Two hours' lecture. Three hours' field work. Continuation of Engineering 1.—I. Messrs. Fenska and Sammi. Prerequisite: Engineering 1.

3. FOREST MENSURATION. A. Required sophomore. Three hours' lecture. A study of the measurements of volume of logs, trees and forest; estimating and mapping of timber, compilation of volume tables

and collection of data in a detailed study of a forest area by stem analysis for purpose of predicting future possibilities.—II. Mr. Belyea.

4. FOREST FINANCE. 3. Three hours' lecture. The business aspects of forest management and the principles of economics and finance underlying the administration of forest properties.—II. Mr. Belyea.

11. FOREST REGULATION. 3. Three hours' lecture. Organization of forests for management. The normal and empirical forest, rotation and methods of regulating the cut—I. Mr. Belyea.

12. APPLIED FOREST MANAGEMENT. 3. The application of management to specific forests and areas as demonstrated by actual practice in the United States.—II. Mr. Belyea.

14. TOPOGRAPHIC SURVEYING. 3. One hour lecture. Six hours' field work. Methods of topographic mapping, by aneroid and pacing, transit and stadia, abney level and slope chain, plane table with telescopic alidade and trigonometric leveling.—II. Messrs. Fenska and Sammi. Prerequisite: Summer Camp Engineering.

15. FOREST INCREMENT. 2. Two laboratory periods. A continuation of Forest Mensuration as applied to the principles of determining increment and yields.—I. Mr. Belyea.

16. FOREST ENGINEERING. 3. Seniors. Two hours' lecture, three hours' field work. The application of engineering principles in the construction of trails, roads, bridges, logging railroads, chutes, flumes, dams, telephone lines, fire towers, cabins, etc., for the development and proper utilization of a forest.—I. Mr. Fenska.

21. MANAGEMENT PROBLEMS. Elective for graduate students only. Individual study of an assigned problem in Forest Management. Hours to be arranged.—I and II. Messrs. Fenska and Belyea.

22. ADVANCED FOREST REGULATION. 3. Elective to graduates only. Problems will be given the student with seminar consultation and outside reading.—II. Mr. Belyea.

## Department of Forest Recreation and Park Engineering

PROFESSORS COX AND FRANCIS; ASSISTANT PROFESSOR ARNOLD; INSTRUCTOR WAGNER; SPECIAL LECTURER ON ORGANIZED CAMPING, FAY WELCH.

### Forest Recreation

*Courses 1 and 5 are required of all undergraduates in Forest Recreation and Park Engineering.*

*Courses 2, 3, 4, 6, 7 and 8 are elective for undergraduates.*

*Courses 15 and 16 are elective for graduates or undergraduates.*

*Course 21 is for graduates only.*

1. RECREATIONAL USES OF LAND AREAS. 3. Lectures, field trips or assignments. A general course covering the economic and social uses

of land areas for recreational purposes.—I and II. Mr. Welch (1931-32 only).

2. DEVELOPMENT OF FOREST PARK RECREATIONAL AREAS. 3. Elective. Open to juniors and seniors. One hour lecture. Six hours' laboratory. This course takes up the elements of structural design.—I and II. Mr. Francis.

3. PROJECTS IN FORESTRY RECREATION. 3. One hour lecture. Six hours' laboratory. A course taking up a study of some of the common problems in forest recreation and their logical solution.—I. Prerequisite: Forest Recreation 1. Mr. Francis.

4. NATIONAL PARK PRACTICE. 2. Two hours' lecture. A brief history of the laws, practices and policies of the State and National Parks.—II. Mr. Francis.

5. CAMPING TECHNIQUE. 3. Lectures, field trips and laboratory exercises. The details of camp technique, such as clothing and equipment, tents and supplies, portaging, packing, fires, cooking, etc.—I and II. Messrs. Welch and \_\_\_\_\_.

6. CAMP ADMINISTRATION AND MAINTENANCE. 3. Lectures, field trips and reports on the operation and management of organized camps. Statistics, budgets, camp location, health standards, camp diet, food supplies, etc.—I. Mr. Welch.

7. PROGRAM BUILDING FOR RECREATIONAL GROUPS. 3. Theory and practice of program building, camp crafts, games and amusements, sports, etc. Case studies in camp program with critical analyses.—I and II. Mr. Welch.

8. NATURE LORE METHODS. 3. Methods of presenting the facts and theories of natural sciences to recreational groups.—I and II. Mr. \_\_\_\_\_ and Mr. \_\_\_\_\_.

15. EUROPEAN PRACTICE IN RECREATIONAL USES OF FORESTS. 3. Elective. Three hours' lecture. A study of practices in Germany, France and Switzerland.—I. Mr. Francis.

16. FOREST RECREATIONAL CAMPS. 3. Elective. One hour lecture. Six hours' laboratory. A study of the various types of camps being developed in forested areas for recreational uses.—II. Mr. Francis.

21. RESEARCH PROBLEMS IN FOREST RECREATION. Graduates only. Hours to be arranged.—I and II.

## Park Engineering

*Course 0 is for students in other colleges; not Forestry.*

*Courses 1, 3, 4 and 7 required of all undergraduates in Forest Recreation and Park Engineering.*

*Courses 2, 5, 6, 8 are elective.*

*Courses 21, 22, 23 are for graduates or specially qualified students.*

0. THE APPRECIATION OF LANDSCAPE ARCHITECTURE. 3. Not open to students of the College of Forestry but to other students of the Uni-



versity. Three hours' lecture. The elements and principles of Landscape Design. Lectures and reports.—II. Messrs. Cox and Arnold.

1. ELEMENTS OF LANDSCAPE DESIGN. 3. Lectures and elementary drafting practice. Principles and history of Landscape Engineering.—I and II. Messrs. Cox, Arnold and Wagner.

2. PLANT MATERIALS. 3. Lectures, field trips, and preparation of planting plans. This course covers deciduous and evergreen shrubs, vines and perennials.—I and II. Mr. Arnold.

3. LANDSCAPE ENGINEERING DESIGN. 4. Lectures and drafting practice in the preparation of original designs in Landscape Engineering.—I and II. Mr. Cox.

4. LANDSCAPE ENGINEERING CONSTRUCTION. 3. Lectures, construction plans and estimates. Road design and pavement construction, grading and drainage details for various types of landscape engineering construction.—I and II. Messrs. Cox and Wagner.

5. CITY PLANNING. 3. Two hours' lecture and one hour reports and assigned reading. The economic, esthetic and engineering principles underlying modern city planning.—I. Messrs. Cox and Arnold.

6. SHADE AND ORNAMENTAL TREES. 3. Three hours' lecture. Deciduous and evergreen trees used for ornamental purposes; their identification, pruning, use and care with especial reference to the details of city forestry practice. The subject of tree repair, or "tree surgery" is covered in the course.—II. Messrs. Wagner and Cox.

7. CAMP AND PARK STRUCTURES. 2. Lectures and drafting. The design and construction of general structures for camps and parks including walls, steps, dams, docks, water and sewage system, and simple buildings.—I and II. Messrs. Cox and Wagner.

8. PARK ADMINISTRATION AND MAINTENANCE. 3. The theory and practice of organization for state, county and municipal park systems, park statics, park budgets, methods of acquisition of park lands, park legislation, etc.—II. Mr. Cox.

21. LANDSCAPE ENGINEERING DESIGN. 6. Elective. Advanced landscape engineering design for 5th year students. The major part of the course is devoted to a thesis with investigation and original design. Prerequisite courses: 1, 2, 3, 4, 5, and Architecture 2.—I and II. Messrs. Cox and Arnold.

22. LANDSCAPE ENGINEERING CONSTRUCTION. 4. Elective. Advanced landscape engineering construction. Original problems with specifications and estimates. Prerequisite courses: 1, 2, 3, 4, 5.—I and II. Messrs. Cox and Wagner.

23. ADVANCED CITY PLANNING. 4. Elective. Special problems in park and city planning design for 5th year students. Prerequisite courses: 1, 2, 3, 4, 5.—I and II. Mr. Cox.

## Department of English

ASSISTANT PROFESSOR LEE

*Course 4 is required of sophomores.*

*Course 5 is required of sophomores in Group VII; juniors in Groups I-V.*

4. LITERATURE SURVEY. 2. A comprehensive survey of English Literature. Essays and critical papers are required for practice in analytical writing.—I and II. Mr. Lee.

5. TECHNICAL EXPOSITION. 2. A study of English as applied in the writing of reports, technical and professional papers, and business correspondence.—I. Mr. Lee.

## Department of Forest Entomology

INSTRUCTORS MACANDREWS AND FLETCHER

*Course 1 is required of all undergraduates in Forestry.*

*Courses 2 and 3 required in certain groups.*

*Courses 11, 12, 13, 14, 15, 16, and 17 may be taken either as elective undergraduate work or as minors in the graduate courses.*

*Course 21 can be taken only as major graduate work.*

1. ELEMENTARY ENTOMOLOGY. 3. Required, sophomore. Two hours' recitation. Three hours' laboratory. A general course devoted to the study of morphology, life histories and general classification of insects.—II. Forest Zoölogy 1 is prerequisite for this course. Mr. Fletcher.

2. FOREST ENTOMOLOGY. 3. Required Junior Protection. Two hours' lecture. Three hours' laboratory. Devoted to a study of insects of economic importance in Forestry.—1. Mr. MacAndrews. Course 1 is prerequisite.

3. INSECTS AFFECTING SHADE TREES AND ORNAMENTAL SHRUBS. 3. Required, Junior Landscape Engineering. First semester. Two hours' lecture. Three hours' laboratory. Intended primarily for students specializing in City Forestry.—I. Mr. MacAndrews. Course 1 prerequisite.

11. ELEMENTARY INSECT TAXONOMY. 3. Elective.—I or II. Courses 1 and 2 are prerequisite. Mr. Fletcher.

12. INSECT ANATOMY. 3. Elective. A more detailed study of the anatomy of certain insects not studied in previous courses.—I or II. Mr. Fletcher.

13. INSECT TAXONOMY. 3. Elective. A more detailed study of classification of some particular groups of forest insects.—I or II. Mr. MacAndrews.



14. INSECT HISTOLOGY. 3. Elective. A study of the methods used in the preparation of insect material for microscopic study.—I or II. Mr. Fletcher.

15. PROBLEMS IN FOREST ENTOMOLOGY. 3. Elective. Individual study of small problems in forest entomology.—I or II. Mr. MacAndrews.

16. SEMINAR. 3. Elective. Library investigation, reports and discussion of forest insects of great economic importance. A study of the phases of entomology not covered in previous courses. Three hours' conference per week. By appointment.—II. Mr. MacAndrews.

17. INSECT ECOLOGY. 3. Elective. Three hours' lecture. A study of the various interacting environmental or habitat factors which influence the relative abundance and distribution of insects, and the practical application of ecological principles to problems in forest entomology. Field and Insectary methods of study. By appointment.—I. Mr. MacAndrews.

21. RESEARCH PROBLEMS IN FOREST ENTOMOLOGY. Elective. For graduate students.—I and II. Staff.

## Department of Silviculture

PROFESSOR MCCARTHY; PROFESSOR PRICHARD; ASSISTANT PROFESSOR HEIBERG; SPECIAL LECTURER ILICK

*Courses 1 and 3 are required of all undergraduates.*

*Course 4 is required of seniors in Groups I, II, III, IV, V and VII; elective elsewhere.*

*Course 11 is required of seniors in Groups I and II; elective elsewhere.*

*Course 12 is elective for undergraduates.*

*Courses 13 and 14 are elective for graduates and undergraduates.*

*Course 21 is elective for graduates only.*

1. FOUNDATION OF SILVICULTURE. 3. Two hours' lecture. Three hours' field work. An analysis of the site factors and their effect on forest vegetation. The reaction of the forest on the site. The forest as a community.—I. Mr. Heiberg.

3. SEEDING AND PLANTING. 3. Two hours' lecture. Three hours' laboratory. A course dealing with all phases of forest propagation especially by seeding and planting.—II. Mr. Prichard.

4. SILVICULTURE SYSTEMS. 3 or 2. Three hours' lecture. Field work in Spring Camp. Reproduction cuttings, intermediate cuttings, cultural operations as used in this country and abroad. In Spring Camp is given preparation of plans for silvicultural treatment of forest tracts together with silvicultural operations in actual practice.—II. Mr. Heiberg.

11. FOREST PROTECTION. 2. Two hours' lecture. Protection of forests from fire, wind, frost, animals, and other destructive agencies.—I. Mr. Prichard.

12. SILVICULTURAL SEMINAR. 2. Elective. Two hours' conference and discussion of silvicultural problems. Designed to give the students a thorough review of the literature on silviculture.—I.

13. EXPERIMENT STATION PROBLEMS. 3. Elective. Organization, supervision, opportunities, training, methods and results of silvicultural research. This course is intended to equip a student for carrying on research work in silviculture.—II.

14. REGIONAL STUDIES. 2. Elective. Silvicultural methods applied in the management of the important species in the different forest regions.—II. Mr. Prichard.

21. SILVICULTURAL RESEARCH. ADVANCED SILVICULTURAL PRACTICE. Elective. For graduate students. Hours to be arranged.—I and II. Messrs. Illick, Prichard and Heiberg.

## Department of Wood Technology

PROFESSOR H. P. BROWN; PROFESSOR FORSAITH; AND  
INSTRUCTOR HARLOW

*Course 1 is required of all undergraduates.*

*Course 3 is required of all undergraduates except those specializing in Landscape Engineering.*

*Courses 2, 4, 5, 6, 11 and 12 are elective for graduate and undergraduates.*

*Course 21 is for graduates only.*

1. ELEMENTARY DENDROLOGY. 4. Required sophomore. Four hours' each semester, 1 hour lecture, 2 hours' recitation, and 3 hours' laboratory. Studies in the identification and taxonomy of woody plants with special reference to the species native to New York State, and other important forest regions of the United States. Studies of silvicultural characteristics and forest regions are included.—I and II. Mr. Harlow.

2. ORNAMENTAL WOODY PLANTS. 3. Elective. One hour conference and 6 hours' laboratory. The identification and taxonomy of ornamental woody plants.—I. Mr. Brown. Prerequisite: Wood Technology 1.

3. WOOD TECHNOLOGY. 3. Required junior. One hour lecture and 6 hours' laboratory. A study of the structural features of wood. Identification of woods by gross and minute structure. The physical properties of wood of value in identification.—I. Mr. Brown. Prerequisite: Wood Technology 1.

4. PAPER-MAKING FIBRES. 3. Elective (required of Pulp and Paper seniors). A morphological and taxonomic study of the fibres used in

paper-making.—II. Mr. Forsaith. Prerequisites: Wood Technology 1 and 3.

11. ADVANCED HISTORICAL MORPHOLOGY. 3. Elective. Two hours' lecture and three hours' laboratory. An evolutionary study of prehistoric and modern woody plants.—I or II. Mr. Forsaith. Prerequisites: Wood Technology 1 and 3.

12. THE MICROTECHNIQUE OF WOODY TISSUE. 3. Elective. One hour lecture and 6 hours' laboratory. Preparation of wood for sectioning, the technique of staining, and the use of the microtome.—I or II. Mr. Harlow. Prerequisites: Wood Technology 1 and 3.

13. TIMBER PHYSICS. 3. Elective. Two hours' lecture and three hours' laboratory. A study of the physical and mechanical properties of wood including descriptive lectures, recitations and practical strength tests. Prerequisites: Wood Technology 1 and 3.—I. Lectures and II. Laboratory Practice. Mr. Forsaith.

14. TIMBERS OF THE WORLD. 3. Elective. One hour lecture and six hours' laboratory and assigned reading. A survey of the more important timbers of the world from the standpoint of structure, physical properties, identification, and uses.—II. Mr. Brown. Prerequisites: Wood Technology 1 and 3.

21. RESEARCH IN DENDROLOGY AND WOOD TECHNOLOGY. Elective for graduates. Hours to be arranged. Messrs. Brown, Forsaith and Harlow.

### Department of Forest Utilization

PROFESSORS N. C. BROWN AND HENDERSON; ASSISTANT PROFESSOR HOYLE; INSTRUCTOR BLEW

*Courses 1, 2, 4, 5, 6, 11, 12, 14 and 17 are required of all undergraduates electing Utilization.*

*Courses 2, 13 and 21 are elective to graduates and undergraduates who have prerequisites.*

1. LOGGING. 3. Three hours' lecture. Required of juniors. History and development of the lumber industry and its relation to forestry. Detailed studies of logging and transportation. Utilization 5 supplements this course and is required of all students taking Utilization—I. Mr. Henderson.

2. LUMBER MANUFACTURE. 3. Three hours' lecture. Second semester. Considerable detail is devoted to the work and problems of manufacturing lumber.—II. Mr. Henderson.

4. FOREST PRODUCTS. 3. Juniors. Three hours' lecture. A study of the so-called minor forest products such as veneer, paper pulp, cooperage, maple sugar, wood distillation, etc.—II. Mr. Blew.

5. FIELD LUMBER STUDY. Following the prerequisite course in Utilization 1, a trip of two weeks to a month's duration is taken either individually or in a party to study the methods of logging and lumber manufacture.—II. Messrs. Henderson, Hoyle and Blew.

6. PORTABLE MILLING AND WOODLOT LOGGING. 1. One hour lecture, three hours' laboratory for eight weeks. Elective, junior. The principles and practice of portable mill work and intensive logging and utilization.—I. Mr. Henderson.

11. LUMBER SALESMANSHIP. 2. Two hours' lecture. Elective, seniors or graduates. The principles underlying salesmanship with particular reference to lumber, and their application in the American lumber industry.—II. Mr. Hoyle.

12. BUSINESS METHODS IN THE LUMBER INDUSTRY. 3. Seniors. Three hours' lecture. A review of particular problems affecting the marketing of lumber.—II. Mr. Hoyle.

13. AMERICAN LUMBER EXPORT TRADE. 2. Two hours' lecture. Elective, seniors or graduates. A study of export methods, ocean shipping, foreign finance and the present and future markets for American Lumber—I or II. Mr. Brown.

14. DRY KILN ENGINEERING. 3. Seniors or graduates. Two hours' lecture and three hours' laboratory. Consisting of a study of the theoretical and practical application of kiln drying of wood products.—I. Mr. Henderson.

15. ADVANCED DRY KILN ENGINEERING. 3. Seniors and graduates. Conferences and laboratory work. A study of dry kiln problems of the wood-working industries.—I. Mr. Henderson.

16. REGIONAL STUDIES IN LOGGING AND MILLING. 3. Seniors. Three hours' lecture. A detailed study will be made to supplement elementary course in Lumbering (Utilization).—II. Mr. Hoyle.

17. WOOD PRESERVATION. 3. Two hours' lecture and field trips. Juniors. Wood preservatives and methods of treatment. Prerequisites: Wood Technology. I—I. Mr. Blew.

18. ADVANCED WOOD PRESERVATION. 3. Seniors. The wood preserving industry. Construction and operation of wood preserving plants. Management and costs. Detailed studies in the use of treated wood.—II. Mr. Blew. Prerequisite: Utilization 17.

19. USES OF WOOD. 2. Two hours' lecture. Seniors. Commercial properties, adaptability, supply and utility of the principle American and foreign species manufactured into lumber.—II. Messrs. Brown and Henderson.

21. SPECIAL PROBLEMS IN UTILIZATION. Elective for seniors and graduates. Conferences and special library and laboratory research in the lumber and associated industries. Hours to be arranged.—I or II. Messrs. Brown, Henderson and Hoyle.

## Department of Forest Zoology

PROFESSOR JOHNSON; ASSISTANT PROFESSOR MUELLER; INSTRUCTOR  
STEGEMAN

*Zoölogy 1 is required of all sophomores.*

*Zoölogy 2, 3 and 11 are open to juniors and seniors.*

*Zoölogy 21 is open only to graduates.*

These courses are designed as a training in the scientific principles of Zoölogy, the relation of animals to forest lands and waters and national and state parks, and in the application of these principles to the scientific, economic and social problems concerned with birds, fish and game, fur-bearing and other forest animals.

1. GENERAL ZOÖLOGY. 3. Required, sophomores. Two hours' recitation. Three hours' laboratory. A course in general principles of Zoölogy.—I. Messrs. Johnson and Stegeman.

2. FISH AND GAME. 3. Elective. Two hours' lecture. Three hours' laboratory or field. A course devoted primarily to a study of the general relations of fish, game, fur-bearing and other forest animals to forestry, emphasizing the scientific, administrative, economic and social aspects of the problem. Prerequisite: Zoölogy 1 or equivalent and Entomology 1.—II. Messrs. Johnson and Stegeman.

3. ECOLOGY OF FRESH WATER ANIMALS. 3. Elective. Two hours' lecture. Three hours' laboratory or field. This course is intended to give a scientific foundation for the application of animal ecology to the aquatic life of the lakes and streams of forest lands and parks.—II.

4. INVERTEBRATE ZOÖLOGY. 3. The biology and classification of the invertebrate animals, designed to furnish a foundation for the understanding of the lower animals forming part of the forest community. Prerequisite: Zoölogy 1.—I and II. Mr. Mueller.

7. MAMMALS. 3. Covering the classification, natural history and economics of the mammals of North America. Prerequisite: Zoölogy 1.—II. Messrs. Johnson and Stegeman.

11. PROBLEMS IN FOREST ZOÖLOGY. Elective; hours to be arranged. Individual study by qualified students of special problems in forest zoölogy. Prerequisites: Zoölogy 1, and 2 or 7.—I and II. Messrs. Johnson and Mueller.

21. RESEARCH IN FOREST ZOÖLOGY. Elective. For graduate students.—I and II. Mr. Johnson and Staff.



## Courses for Students in the College of Forestry Given by Accessory Instructors

These courses are given by departments in the Colleges of Liberal Arts, Applied Science and Fine Arts of the University.

### BOTANY

1. RANGE AND GRAZING. 2. Elective. Two hours. Lectures, assigned reading and conference upon range and grazing problems.—II. Mr. Bray. Prerequisites: Forest Botany 1 and 2.

### ECONOMICS

1. THE ELEMENTARY PRINCIPLES OF ECONOMICS IN THEIR RELATION TO FORESTRY. 3. Three hours' lecture. This course will present those elementary principles and economic science which are essential as an introduction to a more specialized course in forest economics. Lectures, recitations, readings and reports.—I. Mr. Crafer.

5. BUSINESS LAW. 3 Three hours' lecture. A general survey of subjects more closely connected with the ordinary transaction of business.—I.

### ENGLISH

1. FRESHMAN ENGLISH. 3. Required of all freshman. Composition and Rhetoric.—I and II.

### GEOLOGY

2. GENERAL GEOLOGY FOR FORESTRY STUDENTS. 3. I. Mr. Ploger.

### SOILS

1. SOILS. 3. Two hours' lecture, three hours' laboratory or field. A general course including the origin, composition, classification and distribution of soils; their physical, chemical and biological properties and activities and the relation of these to plant growth. II. Mr. H. R. Adams.

### MATHEMATICS

1. TRIGONOMETRY. 3. The solution of triangles with and without logarithms, including the derivation of the necessary formulae; the study of trigonometric functions as functions; the derivation and application of formulae involving the functions of one or more angles; the transformation of expression involving the functions; the solution of trigonometric equations.—I. Department of Mathematics.

### PHYSICS

1. GENERAL PHYSICS. 4. Required of Paper and Pulp students. Three recitation hours, three hours' laboratory.—I and II. Mr. Porter. Prerequisites: Entrance Physics, or Course 4 of the department of Physics and Trigonometry.



5. GENERAL PHYSICS. 3. Two hours' lecture, one hour recitation. This course is required of all sophomores except those in the Paper and Pulp and Landscape Engineering groups. Three hours' laboratory required of all students who have not had Physics in High School.—I and II. Mr. Porter.

### SPEECH

14. ESSENTIALS. 2. A basic course designed to promote knowledge of, and proficiency in, speech. Attention to conversational delivery. Required of seniors who have not had course 15 or its equivalent.—II. Mr. Bartlett.

Those desiring further speech training may elect courses in the College of Liberal Arts. Professor Kennedy in charge.



# THE ROOSEVELT WILD LIFE FOREST EXPERIMENT STATION

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**HUGH P. BAKER, *Dean***  
**Honorary Advisory Council of the**  
**Roosevelt Wild Life Station**

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Charles Eugene Johnson, A.M., Ph.D., *Director*  
Wilford A. Dence, B.S., *Assistant Director*  
Miriam S. Mockford, *Secretary*.

(In addition to the permanent staff the Station maintains a staff of temporary appointments: Scientists who are engaged for the investigation of special problems.)

## THE ROOSEVELT WILD LIFE FOREST EXPERIMENT STATION

**I**N May, 1919, the Legislature of New York passed a bill instructing the trustees of The New York State College of Forestry to establish the Roosevelt Wild Life Forest Experiment Station. This station was created as a memorial to Theodore Roosevelt for his services in behalf of wild life. The duties of the Station are, as defined by the New York law, as follows:

"To establish and conduct an experimental station to be known as 'Roosevelt Wild Life Forest Experiment Station' in which there shall be maintained records of the results of the experiments and investigations made and research work accomplished; also a library of works, publications, papers and data having to do with wild life together with means for practical illustration and demonstration, which library shall, at all reasonable hours, be open to the public."

Furthermore, the duties of the Station are to make "investigations, experiments and research in relation to the habits, life histories, methods of propagation and management of fish, birds, game, and food and fur-bearing animals and forest wild life."

The Station continues the survey of the wild life of forest lands and waters which the College has been conducting since 1912. Investigations have been made covering such topics as the fish, fish food and fish parasites of various inland waters of the State; the relation of birds to the Northern and Western parts of the Adirondack forest; the birds of the Palisades Interstate and Allegany State Parks, and of the Central New York Marshes; also the natural history and economic relations of important New York State mammals such as the beaver, the muskrat and the red squirrel. In addition to these publications and others not here mentioned, which have appeared in the *Roosevelt Wild Life Bulletin* and *Roosevelt Wild Life Annals* to date, the results of more recent work covering various phases of wild life are being prepared for publication and will appear in due time.

Volume 6 of the *Bulletin* and Volume 2 of the *Annals* are now being printed. The editions are limited and do not admit of general free distribution. Exchanges are invited. Address all communications regarding these publications to the Director of the Station.

BULLETIN

OF

The New York State  
College of Forestry

AT

SYRACUSE UNIVERSITY

HUGH P. BAKER, Dean

*Announcement of Courses*



1932 - 1933

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# CALENDAR

1932 — 1933

## 1932

- July 5–Sept. 10.. *Tuesday–Saturday* — Sophomore Summer Camp  
Sept. 17–Sept. 19.. *Saturday–Monday* — Health Examinations  
Sept. 19–Sept. 22.. *Monday–Thursday* — Registration  
Sept. 19–Sept. 24.. *Monday–Saturday* — Freshman Week  
Sept. 23..... *Friday* — Beginning of classes  
Nov. 8..... *Tuesday* — Meeting of Trustees  
Nov. 14..... *Monday* — Middle of first semester  
Nov. 23–Nov. 28.. *Wednesday at 11:00 A. M.–Monday at 8:00 A. M.,*  
Thanksgiving Vacation  
Dec. 22–Jan. 5... *Thursday at 8:00 A.M.–Thursday at 8:00 A. M.,*  
Christmas Vacation

## 1933

- Jan. 23–Jan. 30.. *Monday–Monday* — Midyear Examinations  
Feb. 1..... *Wednesday* — End of first semester  
Feb. 2–Feb. 4... *Thursday–Saturday* — Registration  
Feb. 6..... Beginning of classes  
Mar. 27..... *Monday* — Middle of second semester  
Mar. 30–Apr. 6... *Thursday at 8:00 A.M.–Thursday at 8:00 A. M.,*  
Spring Vacation  
May 24–May 31.. *Wednesday–Wednesday* — Final Examinations  
June 2..... *Friday* — Annual Meeting of Trustees  
June 3..... *Saturday* — Meeting of Alumni Association  
June 4..... *Sunday* — Baccalaureate Service, Gymnasium  
June 5..... *Monday, 10:00 A. M.* — Commencement, Gymnasium

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COLLEGE OF FORESTRY

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RAY R. HIRT, B.S., M.S., PH.D.

*Assistant Professor of Forest Botany*

CLIFFORD H FOSTER, B.S. M.S., M.F.

*Assistant Professor of Forestry; Director of Pack Demonstration Forest*

WILFORD A. DENCE, B.S.

*Assistant Professor; Assistant Director of Roosevelt Wild Life Station*

JUSTUS F. MUELLER, A.B., A.M., PH.D.

*Assistant Professor of Forest Zoology*

C. EUGENE FARNSWORTH, B.S.F., M.F.

*Assistant Professor in Ranger School*

AUBREY H MacANDREWS, B.S., M.S.

*Assistant Professor of Forest Entomology*



VERNON A. YOUNG, B.S., M.S., PH.D.

*Assistant Professor of Forest Botany*

FLOYD C. PETERSON, B.S., M.S.

*Assistant Professor of Pulp and Paper Manufacture*

WILLIAM M. HARLOW, B.S., M.S., PH.D.

*Instructor in Wood Technology*

JOHN C. SAMMI, B.S., M.F.

*Instructor in Forest Engineering*

LEROY C. STEGEMAN, B.S., M.S.

*Instructor in Forest Zoology*

P. J. HADDOCK

*Instructor in Ranger School*

J. OSCAR BLEW, JR., B.S.

*Instructor in Wood Utilization*

FLOYD E. CARLSON, B.S.F., M.F.,

*Instructor in Forest Extension*

STERLING R. WAGNER, B.S., M.L.E.

*Instructor in Landscape Engineering*

RAY F. BOWER, B.S.

*Instructor in Forest Extension*

ORRIN L. LATHAM, B.S.F.

*Instructor in Ranger School*

FRED W. FLETCHER, A.B., M.A.

*Instructor in Forest Entomology*

HOWARD W. MORGAN, B.S., M.S.

*Instructor in Pulp and Paper Manufacture*

WALTER W. CHIPMAN, B.S., A.M.

*Treasurer*

ELEANOR CHURCH, B.L.E.

*Librarian*



# THE NEW YORK STATE COLLEGE OF FORESTRY

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The New York State College of Forestry at Syracuse University was created in 1911 by the Legislature of the State of New York. The College is obligated to undertake such special research and state-wide investigation in forestry as will throw light upon and help in the solution of forestry problems which confront the State and the people of New York, and to serve as the State institution for research, public and student educational work in forestry.

## Location of the College and Facilities for Instruction

In 1913 an appropriation of \$250,000 was made for a forestry building to be located on the campus of Syracuse University. The building was completed and ready for occupancy at the beginning of the second semester in the college year 1916-1917, and is one of the best and most effectively equipped buildings for forestry instruction in the United States.

The Legislature of 1930 appropriated \$600,000 for a new forestry science building which is located on the Syracuse campus near the present college building. It has been named the Louis Marshall Memorial. A new sawmill and a new pulp and paper laboratory were added to the group of buildings now on the Syracuse Campus in 1932. The pulp and paper laboratory is especially well equipped with a cylinder paper machine, pulp beaters, Jordan engines, two types of digesters and much additional apparatus.

The location of the New York State College of Forestry at Syracuse is particularly advantageous for carrying out the professional training of students and state-wide education. From the city of Syracuse the Adirondacks and all sections of New York State are easily accessible by railroads, electric lines and highways. The central location opens conveniently a vast area to field work by the students.

The College is well equipped with apparatus for laboratory work in Utilization, Forest Botany, Pathology, Dendrology, Wood Technology, Zoölogy, Entomology and Paper Pulp experimentation, and with instruments for field work in Forest Mensuration and Surveying.

Excellent library facilities are afforded by the special forest library maintained by the College which includes the most important literature in all languages covering all phases of forestry and the sciences having a bearing on forestry. Additional library facilities are furnished by the main library of Syracuse University and the Public Library of the city of Syracuse.

## **Plan and Scope of Instruction**

Undergraduate instruction comprises the following:

The training of professional foresters for positions in the Federal and State Forest Services, or as experts for private forest work of any kind. In addition to this training provision is also made for specialization in Forestry, Lumbering, Forest Utilization, Forest Management, Forest Chemistry, Forest Entomology, Forest Recreation and Park Engineering, Forest Pathology and Forest Zoölogy.

A special undergraduate course in Pulp and Paper Manufacture is offered. Complete information about this course is available in a special descriptive circular which may be obtained on application to the College.

Students of the University are accepted in courses in which they are particularly interested if prepared to carry the course.

## **Provision for Graduate Work**

The continued advancement in forestry requires a firmer scientific basis. The College acknowledges its responsibility to train men to qualify themselves as competent to carry on independent investigations in the various phases of scientific forestry and in the allied sciences. Further information regarding graduate work will be found on page 18.

## **Training in the State Ranger School**

The New York State Ranger School, one of the departments of the New York State College of Forestry, is located on the Ranger School forest of twenty-three hundred acres in the western Adirondacks near Wanakena. The administrative site borders an arm of Cranberry Lake. An outlay of two hundred seventy-five thousand dollars has been made for buildings and equipment giving the School fine facilities for carrying on its work.

The Ranger School gives a practical course of one year which trains men for such positions as forest guard, forest ranger, tree planting expert and nursery foreman. The work is largely of a practical, intensive nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of various methods of logging and lumbering, nursery practice and tree planting.

For description of course see page 44.

## **Public Service in Forestry**

This consists of:

Instruction, advice and information by means of lectures, motion pictures, magazine and press articles, photographs and correspondence.

Issuing technical bulletins and leaflets embodying results of research and investigation in forestry; informative publications for popular consumption.

Special service to producers and consumers of forest products through special market investigations and studies of closer utilization of waste material.

Advice to individuals, institutions and municipalities on forestry problems.

## **Special Facilities for Field Work**

The College is well equipped with facilities for the essential field work needed by all foresters. The properties available are:

### **THE SYRACUSE FOREST STATION**

This Station is located in the southern part of the city of Syracuse, and consists of a total area of ninety acres made up of two farms purchased and consolidated in the spring of 1912. Since 1912 experimental work has been conducted on the area. The experimental nursery operated by the College is located on this tract. A woodlot of 30 acres is also located here and is utilized for demonstration purposes.

### **THE SALAMANCA FOREST STATION**

This tract, acquired in 1912, consists of 1,016 acres and is located south of Salamanca in Cattaraugus County, adjacent to the Allegany State Park. The forest on this area is a mixed stand of hardwoods consisting of aspen, chestnut, oak and maple. Experimental thinnings have been made and several plantations established in the open portions of the tract. A plan of management has been prepared.

### **THE RANGER SCHOOL FOREST**

In 1912 the Rich Lumber Company, of Wanakena, N. Y., presented to Syracuse University, for use by the New York State College of Forestry for forestry purposes, a tract of 1,850 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks near Wanakena, St. Lawrence County. In December, 1929, The International Paper Company gave an adjoining tract of 500 acres to be added to this forest, making the total area of 2,350 acres. A forest management plan is being prepared for this station. The area is typical of the cut-over land found in northern New York and is well suited for forestry work. The Ranger School Forest is used principally by the students of the State Ranger School. A branch United States Weather Station has been established here. An excellent opportunity for research and experimental work is afforded by the facilities found on this area.

## THE CHARLES LATHROP PACK EXPERIMENTAL FOREST

In 1923 Charles Lathrop Pack presented to Syracuse University, for the use of the New York State College of Forestry, a tract of 1,000 acres, situated on Cranberry Lake, known as the "Barber" tract and on which, since 1915, the College of Forestry Summer Camp has been held. This area serves as a laboratory for the students and is a permanent camp where 10 weeks' practical experience in field methods is given to sophomores each summer. Adjoining this tract and available for field demonstration are State lands included within the Adirondack Park.

## THE CHARLES LATHROP PACK DEMONSTRATION FOREST

In the spring of 1927 an area of 2,250 acres was presented by the Charles Lathrop Pack Forestry Trust to Syracuse University for the use of the New York State College of Forestry. This Forest is in the Lake George-Warrensburg region and is located about 3 miles north of Warrensburg on the main highway between New York City and Montreal. Management plans have been formulated to demonstrate on this area of practicability of the practice of forestry. The Forest also serves as a field laboratory for the study of silviculture and other forest problems.

### SHORT COURSE

A special short-course covering instruction in kiln drying is given annually at the College. This synoptical course is designed primarily for men actively engaged in the industry.

Requests for detailed information of this course should be addressed to the Dean.

### Publications

From time to time the College issues technical publications, bulletins and leaflets on various forestry subjects and problems. A list of such publications will be sent free on application. Most of the popular publications so listed are for free distribution, while a small charge is made for the technical and some of the more formal bulletins.

The News Letter is published quarterly by the College and carries items on the work of the College, news of its Alumni and information of general interest to foresters.

The News Letter is distributed without charge.

Applications for publications should be addressed to the Director of Forest Extension, New York State College of Forestry, Syracuse University, Syracuse, N. Y.

### Communications

All general correspondence should be addressed to the Dean; inquiries and correspondence concerning entrance should be addressed to the Registrar of the New York State College of Forestry, Syracuse University, Syracuse, N. Y.



# GENERAL INFORMATION

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## Expenses

All bills *except* those for dormitory rooms and board are payable to W. W. Chipman, Treasurer, New York State College of Forestry, Syracuse, N. Y. Checks should be drawn payable to W. W. Chipman, Treasurer.

Payments for dormitory rooms and board are due Syracuse University and such checks should be drawn payable to Treasurer of Syracuse University.

## MATRICULATION

Every student on entering the University is required to pay a matriculation fee of \$10.00. This fee is not required of students passing from one college to another within the University nor of students transferring from another institution if evidence is submitted that such a fee was paid in the former institution.

## FEES

All fees for instruction and incidentals are payable twice a year, on or before the first day of each semester. The treasurer's receipt admits to classes.

Students who, for at least twelve months prior to entering the College, have been bona fide residents of the State of New York are exempt from payment of tuition; provided, however, that no student shall be allowed to transfer from the College of Forestry to another college in Syracuse University wherein tuition is charged without first paying \$7.00 per hour for the hours for which he may receive credit in the latter college, with the understanding that from the above amount shall be deducted whatever amount has been collected and retained by the College of Forestry for tuition and fees.

Tuition per year (non-residents).....	\$200.00
Matriculation (paid once).....	10.00
Sophomore Summer Camp (paid once) not including board..	25.00
Library Deposit (returnable) .....	5.00

## PER SEMESTER

General Fee, first semester.....	30.00
General Fee, second semester.....	15.00
Student Activities .....	2.75
Student Loan Fund and Alumni Association (Sophomore year only) .....	1.00
Laboratory Fees (all undergraduates).....	20.00
Laboratory Fees (graduates).....	25.00
Pulp and Paper students \$10 per semester in addition to regular fee beginning first semester sophomore year.	
Diploma Fee (paid at time of graduation).....	10.00

## DORMITORIES

All bills covering residence in dormitories are payable at the office of the University Treasurer. Checks should be drawn payable to Syracuse University. In case payment is not made within two weeks of the time it is due, the student is automatically suspended.

An advance deposit of \$10.00 must be paid by each student when room is engaged or reserved, which will be credited upon the first term's bill and will be refunded in case the student does not become or remain a student in the University, provided the room is given up before September 1.

Rental for room is payable one-half at the beginning of each semester, and no refund is made unless a substitute is obtained acceptable to the University. Board is payable quarterly in advance on or before September 20, November 20, February 1, April 1. If a student for good and sufficient reasons is obliged to leave the University, the portion of board unused will be refunded.

Students may re-engage rooms occupied by them for the following year provided that applications are made prior to April 1, but such rooms will not be held longer than May 15 unless contracts are signed and deposits paid by that date.

Furniture and bed linen are supplied by the University; students must supply their own towels, curtains, rugs and pictures.

Board and room in Sims Hall is \$400 a year, including heat and light. Men wishing information on Sims Hall should address Men's Personnel Office, Syracuse University, Syracuse, N. Y.

Men students not in the dormitory or chapter houses must live in houses approved by the University. A list will be sent on request from the Men's Personnel Office. On arrival the student should be sure that he is in an approved house by demanding to see the "Certificate of Approval." This will avoid the necessity of moving at a later date. Students are urged to reserve rooms before September 1. For any information regarding the living conditions, address Men's Personnel Office.

## SELF-SUPPORT

Many students attend Syracuse University who earn all or a part of their expenses. The earning of board and lodging is not an extremely difficult matter. Only the most brilliant students, however, can expect to earn their total expenses and maintain satisfactory grades.

The Appointment Office in the Administration Building of Syracuse University assists students in securing self-support work. Prospective students may write to the Appointment Office stating the type of work they would like to secure and stating the experience they have had in this work.

## THE CHARLES LATHROP PACK PRIZE

The Charles Lathrop Pack Foundation was established in 1923 by Charles Lathrop Pack, President of the American Tree Association, to encourage students in educational institutions in arousing public interest in forestry and to advance forestry education among the people. A Foundation prize of \$100 is divided annually among three students of the New York State College of Forestry selected by the judges as most worthy of such recognition. An essay-speaking contest in the second semester is held for this purpose.

## THE BOY SCOUT SCHOLARSHIP

Through arrangements made with the National Headquarters of the Boy Scouts of America, the College awards each year a scholarship equal to \$150 in value to the Boy Scout in the State of New York who is considered most worthy of this honor. A Scout who desires to become an applicant for the scholarship should secure an application blank from the Registrar of the College, fill in the blank, and then return the application to the Registrar properly endorsed by the Council Executive. The application will then be recorded and sent to the Regional Director of Scouts for his recommendations. The Scout will be notified by the College of the result of his application. The Scout's scholastic record and photograph should accompany the application.

In order to retain a scout scholarship an average of "C" for all work is required.

## PHYSICAL TRAINING

Good health is necessary to attain high scholarship in college and to perform successfully the duties of later life. With this end in view considerable stress is laid upon well-regulated physical training. Every undergraduate student in the College of Forestry is required to take systematic exercise, including swimming in the gymnasium, during the first year of the course unless physically unable to engage in it.

A medical examination is given every student when he enters upon gymnasium work and his exercises are adapted to the requirements of his health and to the development of a sound body.

The athletic interests of the University are in the hands of the Athletic Association. All business is transacted through the Athletic Governing Board, which includes representatives from the faculty, alumni, students, and interested business men of the city.

## Requirements For Admission

Students entering the forestry course leading to a degree must offer 15 units of preparatory work of high school grade. A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. Two to three hours of laboratory, drawing or shop work count as equivalent to one hour of recitation. No candidate is eligible for admission if deficient in more than 1 count of entrance conditions. Applicants for admission to the New York State College of Forestry must have completed the following subjects with a *general average of 75% for school grades, or a general average of 70% for Regents grades:*

	<i>Units</i>
English (four years).....	3
History (Ancient, Medieval, English, American, or Modern).....	1
Mathematics .....	2
(All applicants must have completed courses in elementary algebra and plane geometry)	
Language (Latin, French, German, or Spanish).....	2
Science .....	1
Elective .....	6
subjects listed above; or in Freehand and Mechanical Drawing; Carpenter Shop or Foundry; Economics; Agriculture. Credit cannot be granted for purely commercial subjects like stenography or typewriting, commercial arithmetic, or business writing.)	
Total .....	15

Applicants for admission to the New York State College of Forestry who show a high scholarship rating in their high school work may be given special consideration with regard to the substitution of other subjects for the specific subjects required for entrance.

The College in maintaining a high standard of work believes that satisfactory college work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of forestry and that there is no short cut to the profession. The College urges every young man who is considering the study of forestry to make up his mind to spend all the time necessary for thorough preparation for college work.

Freshmen are accepted *only* at the beginning of the fall semester. There is no opportunity to enter at midyear except on advanced standing from some other college.

# **UNDERGRADUATE WORK IN THE COLLEGE OF FORESTRY**

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## **I. The Four Year Course in General Forestry Leading to the Degree of Bachelor of Science**

This is essentially a general college course in which the student studies forestry as his major subject. He should realize that it must fall short of the measure of special training necessary for the professional forestry degree. It is designed for students who desire a somewhat intimate knowledge of various branches of forestry for the general satisfaction which such knowledge gives, or for the use they can make of it in a practical way; for those who wish to prepare themselves to teach certain aspects of forestry in the public school; or for those who after their college course wish to take subordinate positions in lumbering or manufacturing of forest products or subordinate positions in state or national forest service. Such students will not be entitled to the designation of professional foresters merely upon the completion of the four years' course.

## **II. The Four Year Course in Pulp and Paper Manufacture Leading to the Degree of Bachelor of Science**

This course has been established to fill the increasing demand for technical men in that important branch of utilization, the pulp and paper industry. The curriculum of the first year is identical with the general forestry course which gives the student the opportunity of determining his future work at the College. The last three years of the course are largely devoted to chemistry, physics, engineering and the technical phases of pulp and paper manufacture. Upon satisfactory completion of the four year program the student should be qualified to enter the pulp and paper industry as a mill control chemist, a technologist in forest products or an operating mill executive.

## **III. The Four Year Course in Forest Recreation and Park Engineering Leading to the Degree of Bachelor of Science**

The rapidly increasing use of the forests for recreation necessitates the training of men for this service. The course gives special attention



to the considerations of fitting men to go into this field of forestry and to be of larger service in developing those phases of work which have to do directly or indirectly with any of the many and diverse uses of forests for recreation.

The objects of this course are two-fold. In the first place it is to prepare men for rendering services in connection with the provision of facilities for forest recreation and the management of forest areas with emphasis on camping technique. Secondly, it aims to equip men with an appreciation of the technique of landscape engineering and the growing of trees for their aesthetic value, just as the growing of trees for their commercial value is the problem of technical forestry.

In addition the course aims to supply the constantly increasing demand of states, cities and towns for men with the scientific knowledge and training of the forester and engineer, and the artistic appreciation of the landscape architect, to care for trees on streets, parkways and boulevards or administer parks and reservations. Upon graduation, students should be qualified to act as assistants to city foresters, park superintendents or landscape engineers or to act as construction or planting superintendents upon any form of landscape or park work or as draftsmen or designers in landscape, park or city planning organizations.

#### **IV. The Five Year Professional Course Leading to the Degree of Master of Forestry**

This course is designed to prepare professional foresters for higher positions of responsibility in the state service, the national forest service and for the position of expert forester for private concerns. The measure of responsibility in such positions, the necessity for breadth of knowledge and maturity of judgment is such that a man must of necessity build his professional training upon a foundation of general culture. It is the unanimous opinion of the leaders in forestry education and in the development of forestry policy in this country, that men who expect to follow the profession of forestry act unwisely if they try to make a short cut by eliminating the foundation training. The large opportunities awaiting thoroughly trained foresters fully justify them in devoting the full measure of time for the five year course.

The fifth year of this course is graduate work and subject to the rules governing graduate work in the College of Forestry.

#### **V. Graduate Work**

Graduate work in the College has been planned with the purpose of training two different types of men—first, the man with a more complete, broad, general training in forestry and, second, the specialist, capable of investigating particular economic and scientific problems of



forestry. The broad, general training is designed to train men as administrators of state, national or private forests or parks. It is strongly urged that students who have shown proper ability in the four year course in the College return and complete a fifth year either immediately following the fourth year or after a year or two of practical work. This five year course leads to the degree of Master of Forestry.

There are a vast number of technical and scientific problems which must be investigated before forestry really comes into its own in this country and such problems can be solved only by the man who has been specially trained in methods of investigation and who is thoroughly conversant with research in his own field. The College of Forestry is offering graduate work in all phases of technical scientific forestry such as silviculture, wood technology, forest pathology, forest entomology, forest zoölogy, forest chemistry, forest recreation and park engineering.

The graduate work is open not only to graduates of forestry courses but under certain restrictions, mentioned in another place, to men whose undergraduate work has been along other scientific lines. Two degrees are open to men taking such work: Master of Science and Doctor of Philosophy.

## **Rules Governing Graduate Work in the College of Forestry**

### **DEGREES OFFERED**

The following degrees will be conferred upon the satisfactory completion of approved schedules of courses and of the other requirements:

Master of Forestry, Master of Science and Doctor of Philosophy.

It should be understood that the time requirements mentioned below are minimum requirements only. The College does not obligate itself to grant degrees, except upon the completion of all the work in a manner satisfactory to its faculty. The College will not grant a degree to anyone who does not possess at least a good general knowledge of forestry.

### **MAJORS AND MINORS**

At the time of enrolling, the candidate for a degree shall submit a schedule consisting of not more than 15 semester hours in each semester. This schedule shall be distributed between a major of nine semester hours and two minors of three semester hours each. If so desired, both the major and one minor may be taken in one department or both minors may be taken in one department. This schedule must receive the approval of the graduate committee and the Dean.

## REQUIREMENTS FOR THE DEGREE OF MASTER OF FORESTRY

For candidates who are graduates of approved courses in technical forestry a minimum of one year of residence work is required. For graduates in other courses a minimum of two years' residence work will be necessary.

A thesis or report showing the candidate's ability to complete satisfactorily an investigation upon a topic connected with the candidate's major study must be submitted to the professor in charge not later than May 1st of the year in which the candidate receives his degree. This, if approved by the professor in charge, and if acceptable to the graduate committee is so endorsed and a copy is deposited in the library.

Upon the acceptance of his thesis the candidate will be notified and provided he has satisfactorily passed written examinations in all his courses he will at the same time be instructed when to appear for an oral examination. This examination will be given by the professors under whom the candidate's work has been taken—the Dean or some member of the graduate committee acting as chairman. Any member of the faculty is privileged to be present. This examination will not take place later than June 1st.

## REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

For students who are graduates in forestry of this institution or others of a similar grade, a minimum of one year of residence work of an acceptable grade is desired.

Students who are graduates in lines other than forestry may be recommended for their degree on the completion of one year of satisfactory residence work provided he has taken at least one minor in forestry.

Similar requirements are made as regards thesis and oral examinations as for the preceding two degrees.

## REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

A candidate must be a graduate of a college of approved standing and his undergraduate education must have been such as to fit him to pursue advanced work in the subject which he chooses as his major. Before beginning the second year of graduate work the candidate must demonstrate his ability to read scientific German and French at sight.

In case the candidate holds only the bachelor's degree a minimum of three years' graduate work is required. One year's residence in graduate work at another college may be substituted with the approval of the Dean and graduate committee.

At the time of enrolling, the candidate must choose the major study and two minor studies subject to the same rules as those governing

other graduate work. If the candidate is not a graduate in forestry at least one of these minors during two years of his course must be in forestry.

A thesis demonstrating the results of scientific research upon a topic bearing upon his major subject must be completed and receive the approval of the major professor not later than May 1st of the year in which the degree is granted. This must be satisfactory to the Dean and graduate committee and after receiving their approval must be printed at the expense of the candidate or it must have been accepted for publication elsewhere. In either case 100 copies must be deposited in the College library.

The candidate is required to pass two examinations, both oral. The preliminary examination will be upon the subjects covered by his major and minors. The final examination will be upon the candidate's thesis

### *GROUP ELECTIVE SYSTEM—*

By this system the student will, at the proper place in his course, elect his work in one of the following seven groups:

- I. Silviculture and Management.
- II. Forest Protection.
- III. Forest Utilization.
- IV. Forest Zoölogy.
- V. Wood Technology—Chemistry.
- VI. Forest Recreation and Park Engineering.
- VII. Pulp and Paper Manufacture.

The students electing the Pulp and Paper course will take the freshman year as prescribed and start this special work at the beginning of the sophomore year—taking the program of subjects as prescribed in Group VI.

All other students of the College will complete the freshmen and sophomore years and the Sophomore Summer Camp. With the beginning of the junior year they will elect one of the five remaining groups.

Student electing Groups I and II and all students in other groups who have elected the course in Silviculture IV and Engineering XI are required to attend the Senior Camp. This will be in session during the month of May of the senior year and will be devoted to field work in Silviculture and Management.

## Program of Courses

### FRESHMAN YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Chemistry 1	4	Chemistry 1	4
Botany 1	3	Botany 2	3
English 1	3	English 1	3
Mathematics 1	3	Mechanical Drawing 2	2
Drawing 1	1	Forest Management 2	3
Forest Management 1	1		
	<hr/> 15		<hr/> 15

### SOPHOMORE YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Botany 3	3	Botany 4	3
English 4	2	English 4	2
Zoology 1	3	Entomology 1	3
For. Man. 4	3	For. Man. 5	3
Physics 5	3	Physics 5	3
Wood Technology 1	4	Wood Technology 1	4
	<hr/> 18		<hr/> 18

SOPHOMORE SUMMER CAMP ON CRANBERRY LAKE IN THE ADIRON-DACKS, 10 weeks beginning the first week in July. Required of all students in Forestry. Prerequisites: Forest Management 3, 4, and 5. Instruction by members of the various departments. No junior who has not had the prescribed engineering at the summer camp will be permitted to take Forest Management 14. All men attending the camp are required to be able to swim.

### GROUP I—SILVICULTURE AND MANAGEMENT GROUP

#### JUNIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
English 5	2	For. Man. 14	3
Entomology 2	3	Gen. Forestry 10	2
Geology 36	3	Silviculture 3	3
Silviculture 1	3	Silviculture 4	3
Utilization 1	3	Soils 1	3
Wood Technology 3	3	Utilization 2	3
	<hr/> 17		<hr/> 17

## SENIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Botany 12	3	For. Man. 6	3
For. Man. 11	3	General Forestry 2	3
For. Man. 15	2	Gen. Forestry 5	2
For. Man. 16	3	Speech 14	2
Gen. Forestry 14	2	Utilization 4	3
Silviculture 11	2	Elective or not	4-6
Silviculture 14	2		
Elective or not	0-2		
	<u>17-19</u>		<u>17-19</u>

## GROUP II—FOREST PROTECTION GROUP

## JUNIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
English 5	2	Botany 11	
Entomology 2	3	or Entomology 12	3
Geology 36	3	For. Man. 14	3
Silviculture 1	3	Gen. Forestry 2	3
Utilization 1	3	Silviculture 3	3
Wood Technology 3	3	Soils 1	3
	<u>17</u>	Group Requirement	2-3
			<u>17-18</u>

## SENIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Botany 12	3	Botany 15	
Business Law 1	2	or Entomology 13	3
Economics 1	3	Chemistry 2	
Entomology 17		or Entomology 16	3
or Chemistry 2	3	Silviculture 4	2
Gen. Forestry 14		Speech 14	2
or Utilization 17	2-3	Group Requirement	4-6
Silviculture 11	3		
	<u>16-17</u>		<u>14-16</u>

Graduate work to be arranged in consultation between the head of the department, chairman of the Graduate Committee, and the student.

## GROUP III—FOREST UTILIZATION GROUP‡

## JUNIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
*Accounting 21	3	Economics 1	3
Economics 1	3	Gen. Forestry 2	3
English 5	2	Silviculture 3	3
Silviculture 1	3	Utilization 2	3
Utilization 1	3	Utilization 4	3
Wood Technology 3	3	Elective or not	0 or 3
	<u>17</u>		<u>15-18</u>

‡ *Field Lumber study (util. 5) during May instead of Senior Camp is required for graduation.*

## SENIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Botany 12		Speech 14	2
or Wood Tech. 13	2-3	Utilization 12	3
*Business Law 1	2	**Utilization 11	2
Utilization 6	1	**Utilization 15	3
Utilization 14	3	**Utilization 18	3
Utilization 16	3	**Wood Tech 13	1
Utilization 17	3	**Utilization 19	2
Elective	3	Util. 21	3
	<u>17-18</u>		<u>19</u>

\* *General University courses.*

\*\* *Recommended electives may be substituted.*



## GROUP IV—FOREST ZOOLOGY

## JUNIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
English 5 (Tech. Expos.)	2	*German 6	
*Geology 36 (Gen. Geol.)	3	or	
*Zoology 5 (Comp. Anat.)	4	*Zoology 6 (Genetics)	3
Silviculture 1	3	Silviculture 4 (S. Systs.)	2
Entomology 2		*Soils	3
or		Zoology 2 (Fish & Game)	
*German 6	3	or	
Zoology 4 (Invert. Zool.)	3	*Zoology 8 (Vert. Zool.)	3 or 4
	18	*Zoology 7 (Mammals)	3
		or	
		Zoology 3 (Ecol. Fr-an.)	3
		Zoology 4 (Invert. Zool.)	
			17-18

## SENIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
*Geology 103 (Paleontology)	3	*Geology 32 (Geomorphology)	3
*Zoology 12 (Histology)	4	*Psychology 1 (Gen. Psych.)	3
*Zoology 105 (Gen. Physiol.)	4	*Zoology 104 (Embryology)	4
*Geology 32 (Geomorphology)	3	*Geology 103 (Paleontology)	3
*Psychology 1 (Gen. Psych.)	3	*Zoology 3 (Ecol. Fr-w. an.)	3
*French	3	or	
	20	Zoology 7 (Mammals)	3
		*French	3
			19

\*Indicates General University courses.

## GROUP V—WOOD TECHNOLOGY—CHEMISTRY GROUP†

## JUNIOR YEAR

	<i>1st Sem. Hrs.</i>		<i>2nd Sem. Hrs.</i>
Chemistry 2	3	Chemistry 2	3
*Physics 2	3	*Physics 2	3
*Chemistry 20	3	*Chemistry 20	3
Wood Technology 3	3	*Botany 25	3
English 5	2	*Mathematics 3	3
Silviculture 1	3	*Elective	3
	17		18

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Chemistry 130	3	*Chemistry 130	3
*Mathematics 104	3	*Mathematics 105	3
Wood Technology 13	2	Wood Technology 13	1
Chemistry 11	3	Wood Technology 12	3
Utilization 1	3	Botany 16	3
Botany 16	3	Speech 14	2
	17	Group Elective	3
			18

† Senior Camp not required for students in this group.

Graduate work to be arranged in consultation between the head of the department, Chairman of the Graduate Committee, and the student.

GROUP VI—FOREST RECREATION AND PARK  
ENGINEERING

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Silviculture 1	3	Silviculture 4	2
Entomology 3	3	Forest Zoology 2	3
Park Engineering 1	3	Park Engineering 1	3
Forest Recreation 1	3	Forest Recreation 1	3
Forest Recreation 5	3	Forest Recreation 5	3
Elective	3	Elective	3 or 4
	18		17 or 18

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Economics 1	3	Speech 14	2
Park Engineering 3	4	Park Engineering 3	4
Park Engineering 4	3	Park Engineering 4	3
Park Engineering 7	2	Park Engineering 7	2
Elective	6	Elective	6 or 7
	18		17 or 18

\* General University courses.

## SUGGESTED ELECTIVES

	1st Sem. Hrs.		2nd Sem. Hrs.
Architecture 2	3	Architecture 2	3
Geology 2	3	Soils 1	3
Geology 32	3	Silviculture 3	3
Engineering 16	3	Engineering 14	3
Physical Education 9	3	Physical Education 9	3
Psychology 5	3	Psychology 5	3
Psychology 104	3	Psychology 104	3
Education 130	3	Zoology 7	3
English 5	2	Park Engineering 2	3
Park Engineering 2	3	Park Engineering 6	3
Park Engineering 5	3	Park Engineering 8	3
Forest Recreation 3	3	Forest Recreation 4	3
Forest Recreation 6	3	Forest Recreation 7	3
Forest Recreation 7	3	Forest Recreation 8	3
Forest Recreation 8	3	Forest Recreation 16	3
Forest Recreation 15	3		

## GROUP VII—PULP AND PAPER MANUFACTURE

*Freshman Year as Prescribed*

## SOPHOMORE YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Chemistry 20, Qualitative	3	*Chemistry 20, Qualitative	3
*Physics 1	4	*Physics 1	4
English 5	2	Speech 14	2
*Math. 2 Analytics	3	*Math. 4, Dif. Calculus	3
Wood Technology 1	4	Wood Technology 1	4
Mechanical Drawing 3	2		16
	18		

*Three Months' Summer Work in a Pulp or Paper Mill*

## JUNIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
*Chemistry 130, Quantitative	3	*Chemistry 130, Quantitative	3
Forest Chemistry 2, Organic	3	Forest Chemistry 2, Organic	3
Math. 5, Int. Calculus	3	Economics 1	3
Pulp and Paper Manufacturing:		Pulp and Paper Manufacturing:	
1—Technology	3	1—Technology	3
2—Laboratory	2	2—Laboratory	2
3—Machinery	2	3—Machinery	2
4—Mill Analyses	2	5—Paper Testing	2
6—Pulp Testing	1	6—Pulp Testing	1
	19		19

*Three Months' Work in a Pulp or Paper Mill*

\* General University courses.

## SENIOR YEAR

	1st Sem. Hrs.		2nd Sem. Hrs.
Wood Technology 3	3	Business Law 1	2
*Business Law 1	2	Wood Technology 4—Fibres	3
*Heat and Power 1	3	*Mechanical Laboratory 3	1
*Electrical Machinery 5	3	*Electrical Machinery 6	3
*Electrical Laboratory 5	1	*Electrical Laboratory 6	1
Pulp and Paper Mfg.—9 Problem	1	Pulp and Paper Mfg.—10 Problem	5
Pulp and Paper Mfg.—7 Coloring	2		15
Forest Chemistry 11—Cellulose	3		
	18		

\* General University courses.

## Description of Courses in the College of Forestry

Note.—A numeral following the title of the course indicates the number of credit hours a week. A credit hour means one recitation (or lecture) hour per week. Three laboratory hours are equivalent to one credit hour. The roman numeral following the description indicates the semester in which the course is given.

### Department of Forest Botany

PROFESSOR MEIER, ASSISTANT PROFESSORS HIRT, YOUNG, AND ASSISTANT PERCIVAL

*Courses 1, 2, 3, 4 required of undergraduates.*

*Courses 11, 12, 13, 14, 15 elective of graduates or undergraduates.*

*Courses 16 and 17 for seniors or graduates.*

*Course 21 for graduates only.*

1. FOREST BOTANY. 3. Required of freshman. Two hours of lecture. Three hour of laboratory. An elementary course throughout the first year dealing with structure and functions of plants and the fundamental problems of Botany, together with a general survey of the plant kingdom.—I. Messrs. Meier, Hirt, Percival, and assistants.

2. FOREST BOTANY. 3. Required of freshman. A continuation of FOREST BOTANY 1—II. Messrs. Meier, Hirt, Percival, and assistants.

3. PLANT PHYSIOLOGY. 3. Required of sophomores. Lectures, recitations, and laboratory. A course designed to teach the fundamental physiological processes involved in growth of plants.—I. Messrs. Meier, Young and assistant. Prerequisites: Courses 1 and 2.

4. TAXONOMY AND ECOLOGY. 3. Required of sophomores. Lectures, recitations, laboratory and field-work. A course dealing with the fundamentals of plant classification and environmental relationships.—II. Messrs. Young and Gottlieb. Prerequisites: Courses 1 and 2.

11. GENERAL MYCOLOGY. 3. Elective. One hour of lecture. Four to six hours of laboratory. A course in the structure and life histories of fungi.—II. Mr. Hirt. Prerequisites: Courses 1, 2 and 3.

12. FOREST PATHOLOGY. 3. Elective. Two hours of lecture. Three hours of laboratory. A course of lectures and laboratory work upon the diseases of plants in general with especial emphasis upon diseases of trees.—I. Mr. Hirt. Prerequisites: Courses 1, 2 and 3.

13. CULTURE METHODS. 3. Elective. Six hours of laboratory and conference. A study of technique in the isolation and pure culture of fungi.—II. Mr. Hirt. Prerequisites: Course 12.

14. ADVANCED MYCOLOGY. 3. Elective. A year course in the classification of fungi.—I. Mr. Hirt. Prerequisites: Course 11.

15. ADVANCED FOREST PATHOLOGY. 3. Elective. One hour lecture. Six hours of laboratory. Individual studies in minor problems in Forest Pathology.—II. Mr. Hirt. Prerequisites: Courses 11 and 12.

16. ADVANCED PLANT PHYSIOLOGY. 3. A year course open to seniors and graduates. A consideration of the fundamental characteristics of living matter and life processes in plants. Hours to be arranged. Mr. Meier.

17. ADVANCED TAXONOMY OF THE FLOWERING PLANTS. 3. Two lectures and one laboratory period. An advanced course in which special attention is given to the taxonomy of natural groups closely related to forestry. Prerequisite: Course 4.—I. Mr. Young.

21. RESEARCH IN FOREST BOTANY AND PATHOLOGY. Elective for graduates.—I and II. Messrs. Bray, Meier, Hirt and Young.

## Department of Pulp and Paper Manufacture

PROFESSORS WISE AND LIBBY, INSTRUCTOR PETERSON

*Courses in Forest Chemistry 2 and 11 are required of all students in Groups IV and VII. They are open to properly qualified students in Forestry. All courses in paper and pulp manufacture are required of students entering this field. Forest Chemistry 12 and 21 are open only to properly qualified graduate students.*

### Forest Chemistry

2. ORGANIC CHEMISTRY. 3. P. and P. junior required. Two hours' lecture and 3 hours' laboratory. This is primarily an elementary course in organic chemistry.—I and II. Mr. Wise. Prerequisite: Chemistry 1.

11. CHEMISTRY OF CELLULOSE. 3. P. and P. senior required. Three hours' lecture. An elementary course in the chemical and physical properties and the use of cellulose and its derivatives.—I. Mr. Wise. Prerequisite: Forest Chemistry 2.

12. CHEMISTRY OF CELLULOSE. 2. Graduate elective. Two hours' lecture (or seminar). Lecture will cover researches on the constitution, properties, and uses of cellulose and its derivatives. This is essentially a graduate course.—II. Mr. Wise. Prerequisite: General Chemistry, Qualitative and Quantitative Analysis, Organic Chemistry, and a reading knowledge of German.

13. SEMINAR. 1. Elective. One hour weekly. Reports on the recent chemical literature dealing with forest products.—I and II. Mr. Wise. Prerequisite: Chemistry 3 or its equivalent.

14. ANALYSIS OF WOOD. 3. Nine hour's laboratory. Quantitative proximate analysis of sound or decayed woods.—II. Mr. Wise. Prerequisites: General Chemistry, Qualitative and Quantitative Analysis, Forest Chemistry 2 and Chemistry 11.

21. RESEARCH IN FOREST CHEMISTRY. Graduate elective. Hours to be arranged. Problems in forest chemistry and organic chemistry will be assigned to properly qualified graduate students.—I and II. Mr. Wise. Prerequisites depend upon the nature of the problem.

## Pulp and Paper Manufacture

*Special bulletin describing the work of the paper and pulp course may be obtained from the Registrar of the College. This course is subject to revision from year to year.*

1. TECHNOLOGY. 3 P. and P. junior required. Three hours' lecture. Study of the processes employed in the manufacture of pulp and paper.—I and II. Mr. Libby. Prerequisites or parallel courses: Chemistry 20 and 130.

2. TECHNOLOGY LABORATORY. 2. P. and P. junior required. Six hours' laboratory. Laboratory demonstrations of the principles of pulp and paper manufacture described in Course 1.—I and II. Mr. Peterson. Prerequisite or parallel courses Pulp and Paper 1 and 3.

3. MACHINERY. 2. First semester and 2 second semester. P. and P. junior required. Three hours' lecture. Lectures on design, construction and operation of machinery used in the pulp and paper industry.—I and II. Mr. Peterson. Prerequisite or parallel courses: Physics 1 and P. and P. 1.

4. MILL ANALYSIS. 2. P. and P. junior required. Six hours' laboratory. Evaluation of materials used in the manufacture of pulp and paper.—I and II. Mr. Peterson. Prerequisite or parallel courses: Chemistry 20 and 130 and P. and P.

5. PAPER TESTING. 2 P. and P. junior required. Six hours' laboratory. Physical, chemical and microscopical characteristics of papers.—II. Mr. Libby. Prerequisites or parallel courses: P. and P. 4.

6. PULP TESTING. 1. P. and P. junior required. Three hours' laboratory. Physical and chemical properties of pulp. Oil and coal analysis.—I and II. Mr. Peterson. Prerequisites or parallel courses: P. and P. 4.

7. COLORING. 2. P. and P. senior required. Six hours' laboratory. Evaluation and identification of dyestuffs and the development of color formulas for dyeing pulp and paper.—I. Mr. Libby. Prerequisites or parallel courses: P. and P. 4.



9. PROBLEM. 1. P. and P. senior required. A report covering a systematic survey of all available literature on some problem of interest to the pulp and paper industry. I. Messrs. Wise, Libby and Peterson. Prerequisites or parallel courses: Pulp and Paper Mfg. 1 to 5. Forest Chem. 2 and 11 and Chem. 20 and 130.

10. PROBLEM. 4. P. and P. senior required. Laboratory development of the problem formulated in course 9.—II. Messrs. Wise, Libby and Peterson. Prerequisite: Pulp and Paper Mfg. 9.

## General Forestry

*Courses 1 and 2 are required of undergraduates, Groups I-IV.*

*Course 10 is required of seniors in Group I.*

*Course 14 is elective for seniors.*

1. GENERAL FORESTRY. 1. A series of lectures designed to acquaint first year men with the objectives of the profession of forestry.—I. Dean Baker.

2. HISTORY OF FORESTRY. 3. The development of forestry as influenced by the growth of human culture and civilization.—II. Mr. Lee.

5. FOREST SEMINAR. 2. Required. Assignment and discussion of current forestry subjects.—II. Dr. Illick.

10. FOREST LAWS AND POLICIES. 2. Required for juniors in the Silviculture and Management group. Two hours' lecture. The object of this course is to gain knowledge of the important laws affecting the National Forests and Public Domain. The forest laws of the principal states engaged in forestry work will be studied in detail. Forest taxation, legislation, administration and state and national policies are discussed.—II. Mr. Hoyle.

14. FOREST ADMINISTRATION. 2. Elective for seniors. Two hours' lecture. The creation and organization of United States Forest Service; with particular reference to the protection, administration and development of the National Forest. Lectures and reports.—I. Dr. Illick.

## Department of Forest Management

PROFESSOR ILLICK, ASSISTANT PROFESSOR BELYEA,

INSTRUCTOR SAMMI

*Courses 1, 2, 3, 4, and 5 are required of all undergraduates, and are prerequisite for Sophomore Summer Camp.*

*Summer Camp Engineering is also required.*

*Courses 11 and 12 are elective to graduates and undergraduates.*

*Courses 21 and 22 are elective to graduates only.*

1. INTRODUCTION TO FORESTRY. 1. This course covers the nature, content and interrelation of the branches of forestry treated from the historical, social and economic aspects.—I. Directed by Assistant Dean Spring.

2. DEVELOPMENT AND ECONOMICS OF FORESTRY. 3. This course covers the development of forestry throughout the world and its relation to human affairs. Special consideration is given to the development of forestry and the forest situation in New York State.—II. Directed by Assistant Dean Spring.

3. PLANE SURVEYING. 3. Required freshmen. Two hours' lecture. Three hours' field work. A preliminary course in the use of surveying instruments and field methods. Mapping and office computations.—I. Mr. Sammi.

4. PLANE SURVEYING. 3. Required sophomore. Two hours' lecture. Three hours' field work. Continuation of Engineering 1.—II. Mr. Sammi. Prerequisite: Course 3.

5. FOREST MENSURATION. 3. Required sophomore. Three hours' lecture. A study of the measurements of volume of logs, trees and forest; estimating and mapping of timber, compilation of volume tables and collection of data in a detailed study of a forest area by stem analysis for purpose of predicting future possibilities.—II. Mr. Belyea.

6. FOREST FINANCE. 3. Three hours' lecture. The business aspects of forest management and the principles of economics and finance underlying the administration of forest properties.—II. Mr. Belyea.

11. FOREST REGULATION. 3. Three hours' lecture. Organization of forests for management. The normal and empirical forest, rotation and methods of regulating the cut.—I. Mr. Belyea.

12. APPLIED FOREST MANAGEMENT. 3. The application of management to specific forests and areas as demonstrated by actual practice in the United States.—II. Mr. Illick.

14. TOPOGRAPHIC SURVEYING. 3. One hour lecture. Six hours' field work. Methods of topographic mapping, by aneroid and pacing, transit and stadia, abney level and slope chain, plane table with telescopic alidade and trigonometric leveling.—II. Messrs. Illick and Sammi. Prerequisite: Summer Camp Engineering.

15. FOREST INCREMENT. 2. Two laboratory periods. A continuation of Forest Mensuration as applied to the principles of determining increment and yields.—I. Mr. Belyea.

16. FOREST ENGINEERING. 3. Seniors. Two hours' lecture, three hours' field work. The application of engineering principles in the construction of trails, roads, bridges, logging railroads, chutes, flumes, dams, telephone lines, fire towers, cabins, etc., for the development and proper utilization of a forest.—I. Mr. Sammi.

21. MANAGEMENT PROBLEMS. Elective for graduate students only. Individual study of an assigned problem in Forest Management. Hours to be arranged.—I and II. Messrs. Illick and Belyea.

22. ADVANCED FOREST REGULATION. 3. Elective to graduates only. Problems will be given the student with seminar consultation and outside reading.—II. Mr. Belyea.

**Department of Forest Recreation and Park Engineering**

PROFESSORS COX AND FRANCIS, ASSISTANT PROFESSOR ARNOLD, INSTRUCTOR WAGNER, SPECIAL LECTURER ON ORGANIZED CAMPING  
FAY WELCH

**Forest Recreation**

*Courses 1 and 5 are required of all undergraduates in Forest Recreation and Park Engineering.*

*Courses 2, 3, 4, 6, 7 and 8 are elective for undergraduates.*

*Courses 15 and 16 are elective for graduates or undergraduates.*

*Course 21 is for graduates only.*

1. RECREATIONAL USES OF LAND AREAS. 3. Lectures, field trips or assignments. A general course covering the economic and social uses of land areas for recreational purposes.—I and II. Mr. Welch.

2. DEVELOPMENT OF FOREST PARK RECREATIONAL AREAS. 3. Elective. Open to juniors and seniors. One hour lecture. Six hours' laboratory. This course takes up the elements of structural design.—I and II. Mr. Francis.

3. PROJECTS IN FORESTRY RECREATION. 3. One hour lecture. Six hours' laboratory. A course taking up a study of some of the common problems in forest recreation and their logical solution.—I. Prerequisite: Forest Recreation 1. Mr. Francis.

4. NATIONAL PARK PRACTICE. 2. Two hours' lecture. A brief history of the laws, practices and policies of the State and National Parks.—II. Mr. Francis.

5. CAMPING TECHNIQUE. 3. Lectures, field trips and laboratory exercises. The details of camp technique, such as clothing and equipment, tents and supplies, portaging, packing, fires, cooking, etc.—I and II. Messrs. Welch and \_\_\_\_\_.

6. CAMP ADMINISTRATION AND MAINTENANCE. 3. Lectures, field trips and reports on the operation and management of organized camps. Statistics, budgets, camp location, health standards, camp diet, food supplies, etc.—I. Mr. Welch.

7. PROGRAM BUILDING FOR RECREATIONAL GROUPS. 3. Theory and practice of program building, camp crafts, games and amusements, sports, etc. Case studies in camp program with critical analyses.—I and II. Mr. Welch.

8. NATURE LORE METHODS. 3. Methods of presenting the facts and theories of natural sciences to recreational groups.—I and II. Mr. \_\_\_\_\_ and Mr. \_\_\_\_\_.

15. EUROPEAN PRACTICE IN RECREATIONAL USES OF FORESTS. 3. Elective. Three hours' lecture. A study of practices in Germany, France and Switzerland.—I. Mr. Francis.

16. FOREST RECREATIONAL CAMPS. 3. Elective. One hour lecture. Six hours' laboratory. A study of the various types of camps being developed in forested areas for recreational uses.—II. Mr. Francis.

21. RESEARCH PROBLEMS IN FOREST RECREATION. Graduates only. Hours to be arranged.—I and II.

## Park Engineering

*Course 0 is for students in other colleges; not forestry.*

*Courses 1, 3, 4 and 7 required of all undergraduates in Forest Recreation and Park Engineering.*

*Courses 2, 5, 6, 8 are elective.*

*Courses 21, 22, 23 are for graduates or specially qualified students.*

0. THE APPRECIATION OF LANDSCAPE ARCHITECTURE. 3. Not open to students of the College of Forestry but to other students of the University. Three hours' lecture. The elements and principles of Landscape Design. Lectures and reports.—II. Messrs. Cox and Arnold.

1. ELEMENTS OF LANDSCAPE DESIGN. 3. Lectures and elementary drafting practice. Principles and history of Landscape Engineering.—I and II. Messrs. Cox, Arnold and Wagner.

2. PLANT MATERIALS. 3. Lectures, field trips, and preparation of planting plans. This course covers deciduous and evergreen shrubs, vines and perennials.—I and II. Mr. Arnold.

3. LANDSCAPE ENGINEERING DESIGN. 4. Lectures and drafting practice in the preparation of original designs in Landscape Engineering.—I and II. Mr. Cox.

4. LANDSCAPE ENGINEERING CONSTRUCTION. 3. Lectures, construction plans and estimates. Road design and pavement construction, grading and drainage details for various types of landscape engineering construction.—I and II. Messrs. Cox and Wagner.

5. CITY PLANNING. 3. Two hours' lecture and one hour reports and assigned reading. The economic, esthetic and engineering principles underlying modern city planning.—I. Messrs. Cox and Arnold.

6. SHADE AND ORNAMENTAL TREES. 3. Three hours' lecture. Deciduous and evergreen trees used for ornamental purposes; their identification, pruning, use and care with especial reference to the details of city forestry practice. The subject of tree repair, or "tree surgery" is covered in the course.—II. Messrs. Wagner and Cox.

7. CAMP AND PARK STRUCTURES. 2. Lectures and drafting. The design and construction of general structures for camps and parks including walls, steps, dams, docks, water and sewage system, and simple buildings.—I and II. Messrs. Cox and Wagner.

8. PARK ADMINISTRATION AND MAINTENANCE. 3. The theory and practice of organization for state, county and municipal park systems, park statics, park budgets, methods of acquisition of park lands, park legislation, etc.—II. Mr. Cox.



21. LANDSCAPE ENGINEERING DESIGN. 6. Elective. Advanced landscape engineering design for 5th year students. The major part of the course is devoted to a thesis with investigation and original design. Prerequisite courses: 1, 2, 3, 4, 5, and Architecture 2.—I and II. Messrs. Cox and Arnold.

22. LANDSCAPE ENGINEERING CONSTRUCTION. 4. Elective. Advanced landscape engineering construction. Original problems with specifications and estimates. Prerequisite courses: 1, 2, 3, 4, 5.—I and II. Messrs. Cox and Wagner.

23. ADVANCED CITY PLANNING. 4. Elective. Special problems in park and city planning design for 5th year students. Prerequisite courses: 1, 2, 3, 4, 5.—I and II. Mr. Cox.

## Department of English

ASSISTANT PROFESSOR LEE

*Course 4 is required of sophomores.*

*Course 5 is required of sophomores in Group VII; juniors in Groups I-V.*

4. LITERATURE SURVEY. 2. A comprehensive survey of English Literature. Essays and critical papers are required for practice in analytical writing.—I and II. Mr. Lee.

5. TECHNICAL EXPOSITION. 2. A study of English as applied in the writing of reports, technical and professional papers, and business correspondence.—I. Mr. Lee.

## Department of Forest Entomology

INSTRUCTORS MACANDREWS AND FLETCHER

*Course 1 is required of all undergraduates in Forestry.*

*Courses 2 and 3 required in certain groups.*

*Courses 11, 12, 13, 14, 15, 16, and 17 may be taken either as elective undergraduate work or as minors in the graduate courses.*

*Course 21 can be taken only as major graduate work.*

1. ELEMENTARY ENTOMOLOGY. 3. Required, sophomore. Two hours' recitation. Three hours' laboratory. A general course devoted to the study of morphology, life histories and general classification of insects.—II. Forest Zoölogy 1 is prerequisite for this course. Mr. Fletcher.

2. FOREST ENTOMOLOGY. 3. Required Junior Protection. Two hours' lecture. Three hours' laboratory. Devoted to a study of insects of economic importance in Forestry.—I. Mr. MacAndrews. Course 1 is prerequisite.

3. INSECTS AFFECTING SHADE TREES AND ORNAMENTAL SHRUBS. 3. Required, Junior Landscape Engineering. First semester. Two hours'

lecture. Three hours' laboratory. Intended primarily for students specializing in City Forestry.—I. Mr. MacAndrews. Course 1 prerequisite.

11. ELEMENTARY INSECT TAXONOMY. 3. Elective.—I or II. Courses 1 and 2 are prerequisite. Mr. Fletcher.

12. INSECT ANATOMY. 3. Elective. A more detailed study of the anatomy of certain insects not studied in previous courses.—I or II. Mr. Fletcher.

13. INSECT TAXONOMY. 3. Elective. A more detailed study of classification of some particular groups of forest insects.—I or II. Mr. MacAndrews.

14. INSECT HISTOLOGY. 3. Elective. A study of the methods used in the preparation of insect material for microscopic study.—I or II. Mr. Fletcher.

15. PROBLEMS IN FOREST ENTOMOLOGY. 3. Elective. Individual study of small problems in forest entomology.—I or II. Mr. MacAndrews.

16. SEMINAR. 3. Elective. Library investigation, reports and discussion of forest insects of great economic importance. A study of the phases of entomology not covered in previous courses. Three hours' conference per week. By appointment.—II. Mr. MacAndrews.

17. INSECT ECOLOGY. 3. Elective. Three hours' lecture. A study of the various interacting environmental or habitat factors which influence the relative abundance and distribution of insects, and the practical application of ecological principles to problems in forest entomology. Field and Insectary methods of study. By appointment.—I. Mr. MacAndrews.

21. RESEARCH PROBLEMS IN FOREST ENTOMOLOGY. Elective. For graduate students.—I and II. Staff.

## Department of Silviculture

PROFESSOR MCCARTHY, PROFESSOR PRICHARD, ASSISTANT  
PROFESSOR HEIBERG

*Courses 1 and 3 are required of all undergraduates.*

*Course 4 is required of seniors in Groups I, II, III, IV, V and VII; elective elsewhere.*

*Course 11 is required of seniors in Groups I and II; elective elsewhere.*

*Course 12 is elective for undergraduates.*

*Courses 13 and 14 are elective for graduates and undergraduates.*

*Course 21 is elective for graduates only.*

1. FOUNDATION OF SILVICULTURE. 3. Two hours' lecture. Three hours' field work. An analysis of the site factors and their effect on forest vegetation. The reaction of the forest on the site. The forest as a community.—I. Mr. McCarthy.



3. SEEDING AND PLANTING. 3. Two hours' lecture. Three hours' laboratory. A course dealing with all phases of forest propagation especially by seeding and planting.—II. Mr. Prichard.

4. SILVICULTURE SYSTEMS. 3 or 2. Three hours' lecture. Field work in Spring Camp. Reproduction cuttings, intermediate cuttings, cultural operations as used in this country and abroad. In Spring Camp is given preparation of plans for silvicultural treatment of forest tracts together with silvicultural operations in actual practice.—II. Mr. Heiberg.

11. FOREST PROTECTION. 2. Two hours' lecture. Protection of forests from fire, wind, frost, animals, and other destructive agencies.—I. Mr. Prichard.

12. SILVICULTURAL SEMINAR. 2. Elective. Two hours' conference and discussion of silvicultural problems. Designed to give the students a thorough review of the literature on silviculture.—I. Mr. McCarthy.

13. EXPERIMENT STATION PROBLEMS. 3. Elective. Organization, supervision, opportunities, training, methods and results of silvicultural research. This course is intended to equip a student for carrying on research work in silviculture.—II. Mr. McCarthy.

14. REGIONAL STUDIES. 2. Elective. Silvicultural methods applied in the management of the important species in the different forest regions.—II. Mr. Prichard.

21. SILVICULTURAL RESEARCH. ADVANCED SILVICULTURAL PRACTICE. Elective. For graduate students. Hours to be arranged.—I and II. Messrs. McCarthy, Prichard and Heiberg.

## Department of Wood Technology

PROFESSOR H. P. BROWN, PROFESSOR FORSAITH,  
INSTRUCTOR HARLOW

*Course 1 is required of all undergraduates.*

*Course 3 is required of all undergraduates except those specializing in Landscape Engineering.*

*Courses 2, 4, 5, 6, 11 and 12 are elective for graduate and undergraduates.*

*Course 21 is for graduates only.*

1. ELEMENTARY DENDROLOGY. 4. Required sophomore. Four hours' each semester, 1 hour lecture, 2 hours' recitation, and 3 hours' laboratory. Studies in the identification and taxonomy of woody plants with special reference to the species native to New York State, and other important forest regions of the United States. Studies of silvicultural characteristics and forest regions are included.—I and II. Mr. Harlow.

2. ORNAMENTAL WOODY PLANTS. 3. Elective. One hour conference and 6 hours' laboratory. The identification and taxonomy of ornamental woody plants.—I. Mr. Brown. Prerequisite: Wood Technology 1.

3. WOOD TECHNOLOGY. 3. Required junior. One hour lecture and 6 hours' laboratory. A study of the structural features of wood. Identification of woods by gross and minute structure. The physical properties of wood of value in identification.—I. Mr. Brown. Prerequisite: Wood Technology 1.

4. PAPER-MAKING FIBRES. 3. Elective (required of Pulp and Paper seniors). A morphological and taxonomic study of the fibres used in paper-making. —II. Mr. Forsaith. Prerequisites: Wood Technology 1 and 3.

11. ADVANCED HISTORICAL MORPHOLOGY. 3. Elective. Two hours' lecture and three hours' laboratory. An evolutionary study of prehistoric and modern woody plants.—I or II. Mr. Forsaith. Prerequisites: Wood Technology 1 and 3.

12. THE MICROTECHNIQUE OF WOODY TISSUE. 3. Elective. One hour lecture and 6 hours' laboratory. Preparation of wood for sectioning, the technique of staining, and the use of the microtome.—I or II. Mr. Harlow. Prerequisites: Wood Technology 1 and 3.

13. TIMBER PHYSICS. 3. Elective. Two hours' lecture and three hours' laboratory. A study of the physical and mechanical properties of wood including descriptive lectures, recitations and practical strength tests. Prerequisites: Wood Technology 1 and 3.—I. lectures and II. Laboratory Practice. Mr. Forsaith.

14. TIMBERS OF THE WORLD. 3. Elective. One hour lecture and six hours' laboratory and assigned reading. A survey of the more important timbers of the world from the standpoint of structure, physical properties, identification, and uses.—II. Mr. Brown. Prerequisites: Wood Technology 1 and 3.

21. RESEARCH IN DENDROLOGY AND WOOD TECHNOLOGY. Elective for graduates. Hours to be arranged. Messrs. Brown, Forsaith and Harlow.

### Department of Forest Utilization

PROFESSOR N. C. BROWN, PROFESSOR HENDERSON, ASSISTANT PROFESSOR HOYLE, INSTRUCTOR BLEW

*Courses 1, 2, 4, 5, 6, 11, 12, 14, 17, and 19 are required of all undergraduates electing Utilization.*

*Courses 2, 13 and 21 are elective to graduates and undergraduates who have prerequisites.*

1. LOGGING. 3. Three hours' lecture. Required of juniors. History and development of the lumber industry and its relation to forestry. Detailed studies of logging and transportation. Utilization 5 supplements this course and is required of all students taking Utilization—I. Mr. Brown.

2. LUMBER MANUFACTURE. 3. Three hours' lecture. Second semester. Considerable detail is devoted to the work and problems of manufacturing lumber.—II. Mr. Brown.

4. FOREST PRODUCTS. 3. Juniors. Three hours' lecture. A study of the so-called minor forest products such as veneer, paper pulp, cooperage, maple sugar, wood distillation, etc.—II. Mr. Blew.

5. FIELD LUMBER STUDY. Following the prerequisite course in Utilization 1, a trip of two weeks to a month's duration is taken either individually or in a party to study the methods of logging and lumber manufacture.—II. Messrs. Brown, Henderson, Hoyle and Blew.

6. PORTABLE MILLING AND WOODLOT LOGGING. 1. One hour lecture, three hours' laboratory for eight weeks. Elective, junior. The principles and practice of portable mill work and intensive logging and utilization.—I. Mr. Henderson.

11. LUMBER SALESMANSHIP. 2. Two hours' lecture. Elective, seniors or graduates. The principles underlying salesmanship with particular reference to lumber, and their application in the American lumber industry.—II. Mr. Hoyle.

12. BUSINESS METHODS IN THE LUMBER INDUSTRY. 3. Seniors. Three hours' lecture. A review of particular problems affecting the marketing of lumber.—II. Mr. Brown.

13. AMERICAN LUMBER EXPORT TRADE. 2. Two hours' lecture. Elective, seniors or graduates. A study of export methods, ocean shipping, foreign finance and the present and future markets for American Lumber.—I or II. Mr. Brown.

14. DRY KILN ENGINEERING. 3. Seniors or graduates. Two hours' lecture and three hours' laboratory. Consisting of a study of the theoretical and practical application of kiln drying of wood products.—I. Mr. Henderson.

15. ADVANCED DRY KILN ENGINEERING. 3. Seniors' and graduates. Conferences and laboratory work. A study of dry kiln problems of the wood-working industries.—I. Mr. Henderson.

16. REGIONAL STUDIES IN LOGGING AND MILLING. 3. Seniors. Three hours' lecture. A detailed study will be made to supplement elementary course in Lumbering (Utilization).—I. Mr. Hoyle.

17. WOOD PRESERVATION. 3. Two hours' lecture and field trips. Juniors. Wood preservatives and methods of treatment. Prerequisites: Wood Technology. I—I. Mr. Blew.

18. ADVANCED WOOD PRESERVATION. 3. Seniors. The wood preserving industry. Construction and operation of wood preserving plants. Management and costs. Detailed studies in the use of treated wood.—II. Mr. Blew. Prerequisite: Utilization 17.

19. USES OF WOOD. 2. Two hours' lecture. Seniors. Commercial properties, adaptability, supply and utility of the principle American and foreign species manufactured into lumber.—II. Mr. Hoyle.

21. SPECIAL PROBLEMS IN UTILIZATION. Elective for seniors and graduates. Conferences and special library and laboratory research in the lumber and associated industries. Hours to be arranged.—I or II. Messrs. Brown, Henderson and Hoyle.

## Department of Forest Zoology

PROFESSOR JOHNSON, ASSISTANT PROFESSOR MUELLER, INSTRUCTOR  
STEGEMAN

*Zoology 1, the introductory course, is required of all sophomores. It is open also to other students who may desire to take it, but graduate credit will not be allowed.*

*Courses 2, 3, 4, and 7 are open to students who have completed Course 1, or its equivalent, and, with the consent of the major advisor, may be taken for minor credit by graduate students.*

*Course 11 is open only to students who have completed Course 1, or its equivalent, and in addition any one or more of Courses 2, 3, 4, or 7, and may, with the approval of the major advisor, be taken for minor credit by graduates students.*

*Course 21 is open only to qualified graduates who choose forest zoology as a major toward an advanced degree.*

*The passing grade for graduate students, in any course open to them, is not less than "B".*

*No student will be considered of graduate standing and qualified to choose forest zoology as a major study toward a higher degree, who has not completed at least 18 credit hours in zoology, selected from the following subjects: general zoology; histology, or embryology; comparative anatomy, or vertebrate zoology; invertebrate zoology; fish and game; ecology of freshwater animals, or animal ecology; mammals, or birds.*

These courses are designed as a training in the scientific principles of Zoölogy, the relation of animals to forest lands and waters and national and state parks, and in the application of these principles to the scientific, economic and social problems concerned with birds, fish and game, fur-bearing and other forest animals.

1. GENERAL ZOÖLOGY. 3. Required, sophomores. Two hours' recitation. Three hours' laboratory. A course in general principles of Zoölogy.—I. Messrs. Johnson and Stegeman.

2. FISH AND GAME. 3. Elective. Two hours' lecture. Three hours' laboratory or field. A course devoted primarily to a study of the general relations of fish, game, fur-bearing and other forest animals to forestry, emphasizing the scientific, administrative, economic and social aspects of the problem. Prerequisite: Zoölogy 1 or equivalent and Entomology 1.—II. Messrs. Johnson and Stegeman.



3. **ECOLOGY OF FRESH WATER ANIMALS.** 3. Elective. Two hours' lecture. Three hours' laboratory or field. This course is intended to give a scientific foundation for the application of animal ecology to the aquatic life of the lakes and streams of forest lands and parks.—II.

4. **INVERTEBRATE ZOÖLOGY.** 3. The biology and classification of the invertebrate animals, designed to furnish a foundation for the understanding of the lower animals forming part of the forest community. Prerequisite: Zoölogy 1.—I and II. Mr. Mueller.

7. **MAMMALS.** 3. Covering the classification, natural history and economics of the mammals of North America. Prerequisite: Zoölogy 1.—II. Messrs. Johnson and Stegeman.

11. **PROBLEMS IN FOREST ZOÖLOGY.** Elective; hours to be arranged. Individual study by qualified students of special problems in forest zoölogy. Prerequisites: Zoölogy 1, and 2 or 7.—I and II. Messrs. Johnson and Mueller.

21. **RESEARCH IN FOREST ZOÖLOGY.** Elective. For graduate students only.—I and II. Mr. Johnson and Staff.

### Accessory Courses

The courses listed below are required of students registered in the College of Forestry, but are given in other colleges of the University.

**ACCOUNTING 21.** Elements of Accounting. 3. Required of juniors in Group III. Given in the College of Business Administration. I.

**BOTANY 25.** Plant Genetics. 3. Required of juniors in Group V. Given in the College of Liberal Arts. II.

**BUSINESS LAW 1.** Elements of Business Law. 2. Required for one semester of seniors in Groups II and III; required for one year in Group VII. Given in the College of Business Administration. I or II.

**CHEMISTRY 1 & 3.** General Chemistry. 4. Required of all freshmen. Given in the College of Liberal Arts. I and II.

**CHEMISTRY 20.** Qualitative Analysis. 3. Required of juniors in Group V, and Sophomores in Group VII. Given in the College of Liberal Arts. I and II.

**CHEMISTRY 130.** Quantitative Analysis. 3. Required of Juniors in Group VII, and seniors in Group V. Given in the College of Liberal Arts. I and II.

**DRAWING 1.** Lettering & Sketching. 1. Required of all freshmen. Given in the College of Applied Science. I.

**DRAWING 2.** Mapping & Projections. 2. Required of all freshmen. Given in the College of Applied Science. II.

**DRAWING 3.** Machine Design. 2. Required of all sophomores in Group VII. Given in the College of Applied Science. I.

**ECONOMICS 1.** Elements. 3. One semester required of seniors in Groups II and VI; one year required of juniors in Group III. Given in the College of Liberal Arts. I and II.

**ELECTRICAL LABORATORY 5.** Experiments. 1. Required of seniors in Group VII. Given in the College of Applied Science. I.

**ELECTRICAL LABORATORY 6.** Experiments. 1. Required of seniors in Group VII. Given in the College of Applied Science II.

**ELECTRICAL MACHINERY 5.** Principles of Electrical Engineering. 3. Required of seniors in Group VII. Given in the College of Applied Science. I.

**ELECTRICAL MACHINERY 6.** Principles of Electrical Engineering. 3. Required of seniors in Group VII. Given in the College of Applied Science. II.

**ENGLISH 1.** Freshman English. 3. Required of all freshman. Given in the College of Liberal Arts. I and II.

**GEOLOGY 36.** General Geology. 3. Required of juniors in Groups I, II and IV. Given in the College of Liberal Arts. I.

**GEOLOGY 32.** Geomorphology. 3. Required of seniors in Group IV. Given in the College of Liberal Arts. I and II.

**GEOLOGY 103.** Paleontology. 3. Required of seniors in Group IV. Given in the College of Liberal Arts. I and II.

**HEAT and POWER 1.** Steam Engines. 3. Required of seniors in Group VII. Given in the College of Applied Science. I.

**MATHEMATICS 1.** Trigonometry. 3. Required of all freshmen. Given in the College of Liberal Arts. I.

**MATHEMATICS 3.** Analytic Geometry. 3. Required of sophomores in Group VII. Given in the College of Applied Science. I.

**MATHEMATICS 3.** Analytic Geometry. 3. Required of juniors in Group V. Given in the College of Liberal Arts. II.

**MATHEMATICS 4.** Differential Calculus. Required of sophomores in Group VII. Given in the College of Applied Science. II.

**MATHEMATICS 5.** Integral Calculus. Required of juniors in Group VII. Given in the College of Applied Science. I.

**MATHEMATICS 104.** Differential Calculus. 3. Required of seniors in Group V. Given in the College of Liberal Arts. I.

**MATHEMATICS 105.** Integral Calculus. 3. Required of seniors in Group V. Given in the College of Liberal Arts. II.

**MECHANICAL LABORATORY 3.** Elements of Mechanical Laboratory. 1. Required of seniors in Group VII. Given in the College of Applied Science. II.

**PHYSICS I.** General Physics. 4. Required of sophomores in Group VII. Given in the College of Liberal Arts. I and II.

**PHYSICS 2.** Advanced General Physics. 3. Required of juniors in Group V. Given in the College of Liberal Arts. I and II.



**PHYSICS 5.** General Physics. 3. All sophomores except Group VII. Laboratory required only of those who have not had high school Physics. Given in the College of Liberal Arts. I and II.

**PSYCHOLOGY 1.** General Psychology. 3. Required of seniors in Group IV. Given in the College of Liberal Arts. I and II.

**SOILS 1.** Soils. 3. Required of juniors in Groups I, II and IV. Given in the College of Agriculture. II.

**SPEECH 14.** Public Speaking. 2. Required of seniors in Groups I, II, III, V and VI; sophomores in Group VII. Given by the School of Public Speech and Dramatic Art. II.

**ZOOLOGY 12.** Histology. 4. Required of seniors in Group IV. Given in the College of Liberal Arts. I.

**ZOOLOGY 104.** Embryology. 4. Required of seniors in Group IV. Given in the College of Liberal Arts. II.

**ZOOLOGY 105.** General Physiology. 4. Required of seniors in Group IV. Given in the College of Liberal Arts. I.

## **New York State Ranger School**

PROFESSOR DUBUAR, PROFESSOR WILLIAMS, ASSISTANT PROFESSOR  
FARNSWORTH, INSTRUCTOR HADDOCK, INSTRUCTOR SANFORD

The New York State Ranger School offers intensive practical training which is completed in eleven months. Classes, and field and laboratory work consume eight hours per day in the proportion of forty per cent to the former and sixty per cent to the latter. The School's equipment is unexcelled. In addition to instruments for surveying, mensuration, woods work, etc., a forest tree nursery is maintained, and plantations and natural stands are found on the property as well as on adjacent areas. Field work is carried on by the students under ideal conditions.

The school year opens the second Wednesday in March and ends on the third Wednesday the following February. Requirements for entrance are not as high as in the case of the full four year course at the College. Applicants must be physically sound, eighteen years of age and not over thirty-five. Young men with only grammar school training will be accepted, though all are advised to complete high school if it is possible. A special bulletin of the Ranger School will be sent upon application to the Director, State Ranger School, Wanakena, N. Y.

The training offered does not provide a complete education in forestry. Rather the object is to prepare young men for work in the field as forest guards, forest rangers, timber estimators, scalers, forest surveyors, nursery and planting foremen and superintendents of small forest estates. A certificate is given by the College to those who satisfactorily complete the course.

# THE ROOSEVELT WILD LIFE FOREST EXPERIMENT STATION

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HUGH P. BAKER, *Dean*  
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(In addition to the permanent staff the Station maintains a staff of temporary appointments: Scientists who are engaged for the investigation of special problems.)

## THE ROOSEVELT WILD LIFE FOREST EXPERIMENT STATION

**I**N May, 1919, the Legislature of New York passed a bill instructing the trustees of The New York State College of Forestry to establish the Roosevelt Wild Life Forest Experiment Station. This station was created as a memorial to Theodore Roosevelt for his services in behalf of wild life. The duties of the Station are, as defined by the New York law, as follows:

"To establish and conduct an experimental station to be known as 'Roosevelt Wild Life Forest Experiment Station' in which there shall be maintained records of the results of the experiments and investigations made and research work accomplished; also a library of works, publications, papers and data having to do with wild life together with means for practical illustration and demonstration, which library shall, at all reasonable hours, be open to the public."

Furthermore, the duties of the Station are to make "investigations, experiments and research in relation to the habits, life histories, methods of propagation and management of fish, birds, game, and food and fur-bearing animals and forest wild life."

The Station continues the survey of the wild life of forest lands and waters which the College has been conducting since 1912. Investigations have been made covering such topics as the fish, fish food and fish parasites of various inland waters of the State; the relation of birds to the Northern and Western parts of the Adirondack forest; the birds of the Palisades Interstate and Allegany State Parks, and the Central New York Marshes; also the natural history and economic relations of important New York State mammals such as the beaver, the muskrat and the red squirrel. In addition to these publications and others not here mentioned, which have appeared in the *Roosevelt Wild Life Bulletin* and *Roosevelt Wild Life Annals* to date, the results of more recent work covering various phases of wild life are being prepared for publication and will appear in due time.

Volume 6 of the *Bulletin* and Volume 3 of the *Annals* are now being printed. The editions are limited and do not admit of general free distribution. Exchanges are invited. Address all communications regarding these publications to the Director of the Station.

BULLETIN

OF

The New York State  
College of Forestry

AT

SYRACUSE UNIVERSITY

SAMUEL N. SPRING, Dean

*Announcement of Courses*



1933 - 1934

Published Quarterly by The New York State College of Forestry at Syracuse, New York. Entered as second-class matter, Oct. 18, 1927, at the Post Office at Syracuse, New York, under the Act of August 24, 1912.





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# CALENDAR

1933 — 1934

1933

- July 3–Sept. 9.. *Monday–Saturday* — Sophomore Summer Camp  
Sept. 11–Sept. 23.. *Monday–Saturday* — Pre-freshman Camp  
Sept. 23..... *Saturday* — Health Examinations  
Sept. 25–Sept. 27.. *Monday–Wednesday* — Registration for first semester  
Sept. 25–Sept. 29.. *Monday–Friday* — Freshman Week  
Sept. 28..... *Thursday*, 8:00 *A. M.* — Beginning of classes  
Nov. 14..... *Tuesday* — Meeting of Trustees  
Nov. 14..... *Tuesday* — Middle of first semester  
Nov. 29–Dec. 4.. *Wednesday*, 5:00 *P. M.*–*Monday*, 8:00 *A. M.* —  
Thanksgiving Vacation  
Dec. 21–Jan. 3.. *Thursday*, 5:00 *P. M.*–*Wednesday*, 8:00 *A. M.* —  
Christmas Vacation

1934

- Jan. 26..... *Friday* — Mid-year Examinations begin  
Feb. 3..... *Saturday* — End of first semester  
Feb. 5 & 6..... *Monday–Tuesday* — Registration for second semester  
Feb. 7..... *Wednesday* — Beginning of classes  
Mar. 24..... *Saturday* — Middle of second semester  
Mar. 24–Apr. 3.. *Saturday*, 11:00 *A. M.*–*Tuesday*, 8:00 *A. M.* —  
Spring Vacation  
May 25..... *Friday* — Final Examinations begin  
June 1..... *Friday* — Annual Meeting of Trustees  
June 2..... *Saturday* — Meeting of Alumni Association  
June 3..... *Sunday* — Baccalaureate Service, Gymnasium  
June 4..... *Monday* — Commencement Exercises, Gymnasium

# TRUSTEES OF THE NEW YORK STATE COLLEGE OF FORESTRY

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ELEANOR CHURCH, B.L.E.

*Librarian*



# THE NEW YORK STATE COLLEGE OF FORESTRY

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## Establishment and Purposes

The New York State College of Forestry at Syracuse University was established in 1911 by the Legislature of the State of New York. As set forth in its charter, the College of Forestry has for its objects and purposes the teaching and instruction of students in the science and practice of forestry and its several branches; the carrying on and promotion of investigation, experiment and research in forestry and its several branches; the conduct upon land acquired by purchase, gift, or lease for such purpose, experiments in forestation, reforestation, the development of forests for public, commercial and recreational purposes, the protection of watercourses and subterranean waterflow, the protection and propagation of the animal life of the forest and forest waters, and, generally, the giving of popular instruction and information concerning the elements of forestry, the effective marketing of forest products and of practical tree-planting throughout the State; the planting, raising, cutting and selling of trees and timber with a view of obtaining and imparting knowledge concerning the scientific management and use of forests, their regulation and administration, and the production, harvesting and reproduction of forest crops and the earning of revenue therefrom.

## Buildings

In 1913 an appropriation of \$250,000 was made for a forestry building to be located on the campus of Syracuse University. This building was completed and ready for occupancy at the beginning of the second semester of the college year, 1916-17. In June 1933 this building was named Bray Hall in honor of Dr. William L. Bray of Syracuse University, who acted as first Dean of the College.

The Legislature of 1930 appropriated \$600,000 for a new forestry science building which is located on the campus of Syracuse University near Bray Hall. This building has been named the Louis Marshall Memorial.

A new sawmill and pulp and paper laboratory were added in 1932 to the group of buildings now on the campus of Syracuse University.

## **Facilities for Instruction**

The College of Forestry is equipped with apparatus for laboratory work in Utilization, Forest Botany, Forest Pathology, Wood Technology, Silviculture and Forest Soils, Forest Zoology and Wild Life, Forest Entomology, and experimental work in Pulp and Paper manufacture. The College is also equipped with instruments for field work in Forest Management and Surveying. Provision is also made for drafting and design work in connection with Forest Recreation and Park Engineering.

A special forest library includes over 10,000 volumes and over 20,000 pamphlets covering all phases of forestry and the sciences having a bearing on forestry.

Additional library facilities are available through access to the libraries of Syracuse University as well as the Public Library of the city of Syracuse.

## **Training in the State Ranger School**

The New York State Ranger School, one of the departments of the New York State College of Forestry, is located on the Ranger School forest of twenty-three hundred acres in the western Adirondacks near Wanakena.

The Ranger School gives a practical course of one year which trains men for such positions as forest guard, forest ranger, tree planting expert and nursery foreman. The work is largely of a practical, intensive nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of various methods of logging and lumbering, nursery practice and tree planting.

For further information write The Director, New York State Ranger School, Wanakena, N. Y.

## **Public Service in Forestry**

This consists of:

Instruction, advice and information by means of lectures, motion pictures, magazine and press articles, photographs and correspondence.

Issuing technical bulletins and leaflets embodying results of research and investigation in forestry; informative publications for popular consumption.

Special service to producers and consumers of forest products through special market investigations and studies of closer utilization of waste material.

Advice to individuals, institutions and municipalities on forestry problems.

For further information regarding public service, write The Director, Extension Service, College of Forestry, Syracuse, N. Y.

## College Properties

### THE SYRACUSE EXPERIMENTAL NURSERY

This nursery is located in the southern part of the city of Syracuse, and consists of a total area of ninety acres made up of two farms purchased and consolidated in the spring of 1912. Since 1912 experimental work has been conducted on the area. A woodlot of 30 acres is also located here and is utilized for demonstration purposes.

### THE SALAMANCA FOREST STATION

This tract, acquired in 1912, consists of 1,016 acres and is located south of Salamanca in Cattaraugus County, adjacent to the Allegany State Park. The forest on this area is a mixed stand of hardwoods consisting of aspen, chestnut, oak and maple. Experimental thinnings have been made and several plantations established in the open portions of the tract. A plan of management has been prepared.

### THE RANGER SCHOOL FOREST

In 1912 the Rich Lumber Company, of Wanakena, N. Y., presented to Syracuse University, for use by the New York State College of Forestry for forestry purposes, a tract of 1,850 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks near Wanakena, St. Lawrence County. In December, 1929, The International Paper Company gave an adjoining tract of 500 acres to be added to this forest, making the total area of 2,350 acres. A forest management plan is being prepared for this station. The area is typical of the cut-over land found in northern New York. The Ranger School Forest is used principally by the students of the State Ranger School. A branch United States Weather Station has been established here.

### THE CHARLES LATHROP PACK EXPERIMENTAL FOREST

In 1923 Charles Lathrop Pack presented to Syracuse University, for the use of the New York State College of Forestry, a tract of 1,000 acres, situated on Cranberry Lake, known as the "Barber" tract and on which, since 1915, the College of Forestry Summer Camp has been held. This area serves as a laboratory for the students and is a permanent camp where 10 weeks' practical experience in field methods is given to sophomores each summer. Adjoining this tract and available for field demonstration are State lands included within the Adirondack Park.

### THE CHARLES LATHROP PACK DEMONSTRATION FOREST

In the spring of 1927 an area of 2,250 acres was presented by the Charles Lathrop Pack Forestry Trust to Syracuse University for the use of the New York State College of Forestry. This Forest is in the

Lake George-Warrensburg region and is located about 3 miles north of Warrensburg on the main highway between New York City and Montreal. A management plan has been prepared for this tract. The Forest also serves as a field laboratory for the study of silviculture and other forest problems. A camp of four weeks is maintained here in the spring of Junior year. A resident forester is located here permanently.

### THE ARCHER AND ANNA HUNTINGTON WILD LIFE FOREST STATION

In 1932, Archer Milton Huntington and his wife, Anna Hyatt Huntington, presented to Syracuse University, in trust, for the use of the New York State College of Forestry, a tract of forest land comprising 13,000 acres in the Central Adirondacks near the village of Newcomb, Essex County. Catlin and Rich Lakes, and a number of smaller lakes and streams are within the forest boundary. In the deed of gift from Dr. and Mrs. Huntington is contained the covenant that "the said premises will be used for investigation, experiment and research in relation to the habits, life histories, methods of propagation, and management of fish, birds, game, food and fur-bearing animals, and as a forest of wild life."

### SHORT COURSE

A special short-course covering instruction in kiln drying is given annually at the College. This synoptical course is designed primarily for men actively engaged in the industry.

Requests for detailed information of this course should be addressed to the Department of Wood Utilization.

### Publications

From time to time the College issues technical publications, bulletins and leaflets on various forestry subjects and problems. A list of such publications will be sent free on application. Most of the popular publications so listed are for free distribution, while a small charge is made for the technical and some of the more formal bulletins.

The News Letter is published quarterly by the College and carries items on the work of the College, news of its Alumni and information of general interest to foresters.

Applications for publications should be addressed to the Director of Forest Extension, New York State College of Forestry, Syracuse University, Syracuse, N. Y.

### Communications

All general correspondence should be addressed to the Dean; inquiries and correspondence concerning entrance should be addressed to the Registrar of the New York State College of Forestry, Syracuse University, Syracuse, N. Y.



# GENERAL INFORMATION

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## Expenses

All bills *except* those for dormitory rooms and board are payable to W. W. Chipman, Treasurer, New York State College of Forestry, Syracuse, N. Y. Checks should be drawn payable to W. W. Chipman, Treasurer.

Payments for dormitory rooms and board are due Syracuse University and such checks should be drawn payable to Treasurer of Syracuse University.

## MATRICULATION

Every student on entering the University is required to pay a matriculation fee of \$10.00. This fee is not required of students passing from one college to another within the University nor of students transferring from another institution if evidence is submitted that such a fee was paid in the former institution. This fee is paid at the time of registration for the full semester.

## FEES

All fees for instruction and incidentals are payable twice a year, on or before the first day of each semester. The treasurer's receipt admits to classes.

Students who, for at least twelve months prior to entering the College, have been bona fide residents of the State of New York are exempt from payment of tuition; provided, however, that no student shall be allowed to transfer from the College of Forestry to another college in Syracuse University wherein tuition is charged without first paying \$7.00 per hour for the hours for which he may receive credit in the latter college, with the understanding that from the above amount shall be deducted whatever amount has been collected and retained by the College of Forestry for tuition and fees.

Tuition per year (non-residents).....	\$200.00
Matriculation (paid once).....	10.00
Sophomore Summer Camp (paid once) not including board..	25.00
Library Deposit (returnable) .....	5.00

## PER SEMESTER

General Fee, first semester.....	\$30.00
General Fee, second semester.....	15.00
Student Activities .....	2.75
Student Loan Fund and Alumni Association (Sophomore year only) .....	1.00
Laboratory Fees (all undergraduates).....	20.00
Laboratory Fees (graduates).....	25.00
Pulp and Paper students \$10 per semester in addition to regular fee beginning first semester junior year.	
Diploma Fee (paid at time of graduation).....	10.00

From time to time additional expenses are incurred in connection with special trips and camp periods.

## DORMITORIES

All bills covering residence in dormitories are payable at the office of the University Treasurer. Checks should be drawn payable to Syracuse University. In case payment is not made within two weeks of the time it is due, the student is automatically suspended.

An advance deposit of \$10.00 must be paid by each student when room is engaged or reserved, which will be credited upon the first term's bill and will be refunded in case the student does not become or remain a student in the University, provided the room is given up before September 1.

Rental for room is payable one-half at the beginning of each semester, and no refund is made unless a substitute is obtained acceptable to the University. Board is payable quarterly in advance on or before September 20, November 20, February 1, April 1. If a student for good and sufficient reasons is obliged to leave the University, the portion of board unused will be refunded.

Students may re-engage rooms occupied by them for the following year provided that applications are made prior to April 1, but such rooms will not be held longer than May 15 unless contracts are signed and deposits paid by that date.

Furniture and bed linen are supplied by the University; students must supply their own towels, curtains, rugs and pictures.

Board and room in Sims Hall is \$400 a year, including heat and light. Men wishing information on Sims Hall should address Men's Personnel Office, Syracuse University, Syracuse, N. Y.

Students not in the dormitory or chapter houses must live in houses approved by the University. A list will be sent on request from the Men's Personnel Office. On arrival the student should be sure that he is in an approved house by demanding to see the "Certificate of Approval." This will avoid the necessity of moving at a later date. Students are urged to reserve rooms before September 1. For any information regarding the living conditions, address Men's Personnel Office.

### SELF-SUPPORT

Many students attend Syracuse University who earn all or a part of their expenses. The earning of board and lodging is not an extremely difficult matter. Only the most brilliant students, however, can expect to earn their total expenses and maintain satisfactory grades.

The Appointment Office in the Administration Building of Syracuse University assists students in securing self-support work. Prospective students may write to the Appointment Office stating the type of work they would like to secure and stating the experience they have had in this work.

### THE CHARLES LATHROP PACK PRIZE

The Charles Lathrop Pack Foundation was established in 1923 by Charles Lathrop Pack, President of the American Tree Association, to encourage students in educational institutions in arousing public interest in forestry and to advance forestry education among the people. A Foundation prize of \$100 is divided annually among three students of the New York State College of Forestry selected by the judges as most worthy of such recognition. An essay-speaking contest in the second semester is held for this purpose.

### THE BOY SCOUT SCHOLARSHIP

Through arrangements made with the National Headquarters of the Boy Scouts of America, the College awards each year a scholarship equal to \$150 in value to the Boy Scout in the State of New York who is considered most worthy of this honor. A Scout who desires to become an applicant for the scholarship should secure an application blank from the Registrar of the College, fill in the blank, and then return the application to the Registrar properly endorsed by the Council Executive. The application will then be recorded and sent to the Regional Director of Scouts for his recommendations. The Scout will be notified by the College of the result of his application. The Scout's scholastic record and photograph should accompany the application.

In order to retain a scout scholarship an average of "C" for all work is required.

### PHYSICAL TRAINING

Good health is necessary to attain high scholarship in college and to perform successfully the duties of later life. With this end in view considerable stress is laid upon well-regulated physical training. Every undergraduate student in the College of Forestry is required to take systematic exercise, including swimming in the gymnasium, during the first year of the course unless physically unable to engage in it.

A medical examination is given every student when he enters upon gymnasium work and his exercises are adapted to the requirements of his health and to the development of a sound body.

The athletic interests of the University are in the hands of the Athletic Association. All business is transacted through the Athletic Governing Board, which includes representatives from the faculty, alumni, students, and interested business men of the city.

## Requirements For Admission

Students applying for admission to the New York State College of Forestry must be graduates of an accredited high school or preparatory school, and must offer a minimum of 15 units of preparatory work of high school grade as indicated below:

	Units
English (four years).....	3
History (Ancient, Medieval, English, American, or Modern).....	1
Mathematics .....	2½
(All applicants must have completed courses in elementary and intermediate algebra, and plane geometry)	
Language (Latin, French, German, or Spanish).....	2
Science .....	1
Elective .....	5½
subjects listed above; or in Freehand and Mechanical Drawing; Carpenter Shop or Foundry; Economics; Agriculture. Credit cannot be granted for purely commercial subjects like stenography or typewriting, commercial arithmetic, or business writing.)	
Total .....	15

A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. Two to three hours of laboratory, drawing or shop work count as equivalent to one hour of recitation.

No applicant will be considered as eligible for admission who has had less than 15 units of preparatory work. However, in cases where an applicant may offer courses which do not cover the requirements specified above, he may be considered as eligible provided he is not deficient in more than one unit of the above requirements; but no applicant will be considered as eligible for admission if deficient in more than one unit.

In addition to a unit count, an applicant to be considered as eligible for admission to the College of Forestry must also show a quality standard of preparatory work. This standard is based upon Regents grades of 70 per cent or better for acceptance of courses for entrance credit. Where courses are offered in which a Regents grade is not given, then a school grade of 75 per cent or better is required.

The College in maintaining a high standard of work believes that satisfactory college work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of forestry and that there is no short cut to the profession. The College urges every young man who is considering the study of forestry to make up his mind to spend all the time necessary for thorough preparation for college work.

Freshmen are accepted *only* at the beginning of the fall semester.



## UNDERGRADUATE WORK

The curriculum is divided into two major divisions, I and II (see Chart, page 21). Division I deals primarily with the forest, and Division II with the products. At the end of the freshman year, each student must choose the division in which he wishes to pursue the balance of his course. He should be able to decide whether he wishes to make his life work concerned with the handling of the growing forest, or with the utilization and distribution of its products.

### Division I

This division is further separated into two groups: Forest and Game Management, and Landscape and Recreational Management. The former group emphasizes forest production and trains men for positions as forest and game managers with the United States Forest Service, Forest Service work in the various states, or as forest and game managers for private forest enterprises. There is also opportunity for specialization in Forest Entomology and Forest Pathology. The second group emphasizes landscape and recreational use of the forest and trains men for positions with state and national parks and private recreational activities.

### Division II

This division emphasizes the industrial aspect of utilization, manufacturing and distribution of the products of the forest, and trains men in preparation for positions found largely in connection with private industries such as lumber companies, wood-working industries, and pulp and paper mills. (For further information on pulp and paper manufacture, write for special bulletin.)

## GRADUATE WORK

An opportunity for graduate work is provided at the New York State College of Forestry at Syracuse University in professional and scientific lines leading to the appropriate advanced degree.

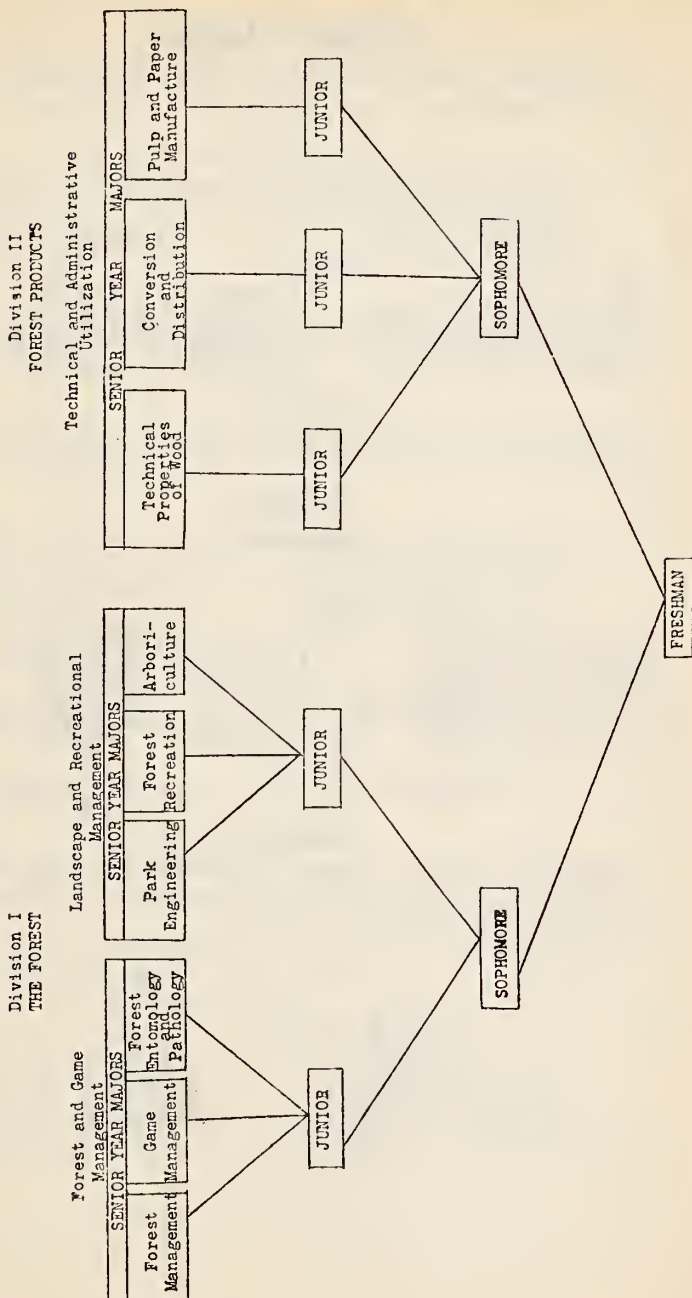
This work may be done in the professional fields of forest management, silviculture, the lumber industry, wood technology, paper and pulp manufacture, park engineering and recreational use of the forest, and like professional and business phases, or it may be within the scientific fields of botany, entomology, zoology, chemistry or similar lines. For the Ph.D. degree scientific work is required of a character conforming to recognized standards.

The program of a graduate student is determined by the professors constituting the committee under whose direction the work is to be carried out. Graduate instruction under professors in the other colleges of Syracuse University may be included in the candidate's program by direction of his committee. Only students of satisfactory grade in scholarship will be accepted. Applicants for admission to graduate work must have received a Bachelor's degree from an institution of recognized standing and have had substantially the same training in forestry as is given in the New York State College of Forestry. If the applicant had not had such undergraduate training his rating and program will be determined in each case by the committee on advanced standing in consultation with the head of the department concerned with the field in which he desires to specialize.

Applicants for graduate work should address correspondence to: The Chairman of the Graduate Committee, New York State College of Forestry, Syracuse, N. Y.



CHART SHOWING ORGANIZATION OF COURSES.



## Program of Courses

For sequence of years see Diagram of Courses on page 21. For description of courses, see page 28.

### FRESHMAN YEAR

To be taken by all students.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Botany 1 (Gen. Botany)	3	Botany 1 (Gen. Botany)	3
Chemistry 1 (Gen. Inorganic)	4	Chemistry 1 (Gen. Inorganic)	4
Drawing 1 (Lettering & Sketch)	1	Drawing 2 (Mech. Draw.)	2
English 1 (Freshman Engl.)	3	English 1 (Freshman Engl.)	3
Gen. Forestry 1 (Dev. of For.)	2	Gen. Forestry 1 (Dev. of For.)	2
Mathematics 4 (Unified Math.)	3	Mathematics 4 (Unified Math.)	3
	<hr/> 16		<hr/> 17

After freshman year, all students must make choice of Divisions for subsequent courses.

### DIVISION I

#### SOPHOMORE YEAR

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Botany 3 (Plant Physiol.)	3	Botany 4 (Taxonomy) <i>Comp. 1</i>	2
English 2 (Composition)	2	English 3 ( <del>Tech.</del> Exposition) <i>Lib.</i>	2
For. Man. 3 (Surveying)	3	Entomology 1 (Elem. Ent.)	2
Physics 5 (Topics of Physics)	2	For. Man. 3 (Surveying)	3
Speech 14 (Pub. Speaking)	2	For. Man. 5 (Mensuration)	3
Wood Tech. 1 (Dendrology)	3	Physics 5 (Topics of Physics)	2
Zoology 1 (Gen. Zool.)	2	Wood Tech. 1 (Dendrology)	3
	<hr/> 17		<hr/> 17

#### SUMMER CAMP

Situated on Cranberry Lake in the Adirondacks. Begins the first week in July and runs for 10 weeks. Prerequisites: For. Man. 3, 5; Botany 4; Wood Tech. 1.

	<i>Credit Hours</i>
Dendrology	$\frac{1}{2}$
Ecology & Taxonomy	1
Silviculture	1
Surveying	$3\frac{1}{2}$
Mensuration	$3\frac{1}{2}$
Manual Arts	$\frac{1}{2}$
	<hr/> 10

## JUNIOR YEAR

To be taken by students in Forest and Game Management.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Economics 1 (General)	3	*Botany 11 (Mycology)	3
Entomology 2 (For. Ent.)	3	For. Man. 18 (For. Econ.)	3
Geology 36 (For. Geol.)	3	Silviculture 3 (Seed & Plant.)	3
Mapping	1	**Silviculture 4 (Practice)	3
Silviculture 1 (Found. Silv.)	3	Soils 1 (Prop. of Soils)	3
Utilization 1 (Logging)	3	Utilization 2 (Lbr. Mfg.)	3
Wood Tech. 3 (Wood Ident.)	3	Utilization 4 (For. Products)	3
	19		18 or 21

\* To be taken by Entomology and Pathology men only.

\*\* Given at Pack Forest, Warrensburg, N. Y. during May.

## JUNIOR YEAR

To be taken by students in Landscape and Recreational Management.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Economics 1 (General)	3	Entom. 3 (Shade Tree Insects)	3
Geology 36 (For. Geol.)	3	FR-PE 4 (Design)	3
Mapping	1	Silviculture 3 (Seed. & Plant)	3
FR-PE 4 (Design)	3	Zoology 2 (Fish & Game)	3
Silviculture 1 (Found. of Silv.)	3	And in Addition:	
And in Addition:		Architecture 2 (Elements)	3
Architecture 2 (Elements)	3	FR-PE 8 (Plant Materials)	3
FR-PE 8 (Plant Materials)	3		18
	19	Or:	
Or:		FR-PE 1 (Rec. Devel.)	3
FR-PE 1 (Rec. Devel.)	3	FR-PE 10 (Camp. Tech.)	3
FR-PE 10 (Camp. Tech.)	3		18
	19	Or:	
Or:		FR-PE 8 (Plant Materials)	3
FR-PE 8 (Plant Materials)	3	Soils 1 (Prop. of Soils)	3
Wood Tech. 3 (Wood Ident.)	3		18
	19		

## SENIOR YEAR

To be taken by students in Forest Management.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Botany 12 (For. Pathology)	3	Accounting 21 (For. Accts. & Records)	3
For. Man. 6 (For. Finance)	3	For. Man. 11 (Regulation)	3
For. Man. 15 (Increment)	2	For. Man. 19 (Forest Struct.)	3
For. Man. 16 (Roads & Trails)	3	For. Man. 20 (Law & Policy)	2
For. Man. 17 (Administration)	3	Silviculture 14 (Reg. Silvi.)	2
Silviculture 11 (Protection)	3	Utilization 19 (Uses of Wood)	2
Trip during January	2	Elective	3
	19		18

## SENIOR YEAR

To be taken by students in Game Management.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Botany 12 (For. Pathology)	3	For. Man. 11 (Regulation)	3
For. Man. 17 (Administration)	3	For. Man. 20 (Law & Pol.)	2
For. Recreation 1 (Rec. Devel.)	3	Zoology 3 (Ec. of Fr. Water Animals)	3
Silviculture 11 (Protection)	3	Zoology 7 (Game Mammals)	2
Zoology 4 (Invertebrates)	3	Zoology 8 (Game Birds)	2
Zoology 5 (Parasites of Fish & Game Animals)	3	Elective	6
Zoology 6 (Fish)	2		18
	20		

## SENIOR YEAR

To be taken by students in Entomology and Pathology.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Botany 12 (For. Pathology)	3	Botany 15 (Adv. Path.)	3
Entomology 12 (Anatomy)	3	Entomology 11 (Taxonomy)	3
Entomology 16 (Seminar)	3	Entomology 17 (Ecology)	3
For. Man. 15 (Increment)	2	For. Man. 20 (Law & Policy)	2
For. Man. 17 (Administration)	3	Elective	8
Silviculture 11 (Protection)	3		19
Elective	3		
	20		

## SENIOR YEAR

To be taken by students in Landscape and Recreational Management.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
FR-PE 5 (Adv. Design)	5	FR-PE 5 (Adv. Design)	4
FR-PE 14 (Camp & Part Struct.)	3	FR-PE 14 (Camp & Park Struct.)	3
In Addition:		Problem	1
FR-PE 6 (Construction)	3	In Addition:	
FR-PE 7 (City Plan.)	3	FR-PE 6 (Construct.)	3
Pencil Technique	1	FR-PE 9 (Shade Trees)	3
Silviculture 6 (Systems)	2	FR-PE 15 (Admin.)	3
	17	Sketch	1
Or:			18
FR-PE 11 (Camp Admin.)	3	Or:	
FR-PE 17 (European For. Rec.)	3	FR-PE 16 (Nat. Park.)	3
Phys. Ed. 9 (Teach. Meth. Phys. Ed.)	3	FR-PE 11 (Camp. Admin.)	3
	17	Phys. Ed. 9 (Teach. Meth. Phys. Ed.)	3
Or:			17
FR-PE 6 (Construct.)	3	Or:	
FR-PE 7 (City Plan.)	3	FR-PE 6 (Const.)	3
Botany 12 (For. Path.)	3	FR-PE 9 (Shade Trees)	3
	17	Elective	3
			17

## DIVISION II

## SOPHOMORE YEAR

To be taken by students in Technical and Administrative Utilization.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Chemistry 20 (Qual. Anal.)	3	Accounting 21 (Elements)	3
English 2 (Composition)	2	Chemistry 20 (Qual. Anal.)	3
Physics 1 (Gen. Physics)	4	English 3 (Tech. Expo.)	2
Math. 4a (Dif. Calc.)	3	Physics 1 (Gen. Physics)	4
Mech. Draw. 3 (Mach. Design)	2	Math. 5 (Int. Calc.)	3
Wood Tech. 2 (Dendrology II)	3	Speech 14 (Pub. Speak.)	2
	<hr/> 17		<hr/> 17

## SUMMER CAMP

Situated on Cranberry Lake in the Adirondacks, begins the first week in July and runs for 10 weeks. Prerequisite: Wood Tech. 2.

	<i>Credit Hours</i>
Dendrology	$\frac{1}{2}$
Silviculture	1
Surveying (Theory & Pract.)	3
Mensuration (Theory & Pract.)	3
Layout & Operation of Manufacturing Plants)	2
Manual Art	$\frac{1}{2}$
	<hr/> 10

## JUNIOR YEAR

To be taken by students of Technical Properties of Wood.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Botany 3 (Plant Phys.)	3	Elec. Mach. 6 (Principles)	3
Elec. Mach. 5 (Prin. Elec. Engr.)	3	Elec. Lab. 6 (Experiments)	1
Elec. Lab. 5 (Experiments)	1	Mech. Lab. 3 (El. Mech. Lab.)	1
Heat & Power 1 (Steam Engines)	3	Pulp & Paper 11 (Forest Chem.)	3
Pulp & Paper 11 (Forest Chem.)	3	Utilization 2 (Lumber Mfg.)	3
Utilization 1 (Logging)	3	Utilization 4 (Products)	3
Wood Tech. 4 (Wood Ident.)	2	Utilization 7 (W. W. Mach.)	2
	<hr/> 18	Wood Tech. 4 (Wood Ident.)	2
			<hr/> 18

## JUNIOR YEAR

To be taken by students in Conversion and Distribution.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Botany 3 (Plant Phys.)	3	Bus. Law 1 (Elements)	2
Economics 1 (General)	3	Economics 1 (General)	3
Heat & Power 1 (Steam Engines)	3	Mech. Lab. 3 (El. Mch. Lab.)	1
Utilization 1 (Logging)	3	Utilization 2 (Lumber Mfg.)	3
Wood Tech. 4 (Wood Ident.)	2	Utilization 4 (Products)	3
Elective	3	Utilization 7 (W. W. Mach.)	2
	17	Wood Tech. 4 (Wood Ident.)	2
		Elective	3
			19

## JUNIOR YEAR

To be taken by students in Pulp and Paper Manufacture.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Chemistry 130 (Quan. Anal.)	3	Bus. Law 1 (Elements)	2
Economics (General)	3	Chemistry 130 (Quan. Anal.)	3
Pulp & Paper 1 (Technology)	3	Pulp & Paper 1 (Technology)	3
Pulp & Paper 2 (Tech. Lab.)	2	Pulp & Paper 2 (Tech. Lab.)	2
Pulp & Paper 3 (Machinery)	2	Pulp & Paper 3 (Machinery)	2
Pulp & Paper 4 (Mill Anal.)	2	Pulp & Paper 5 (Pulp Test)	2
Pulp & Paper 5 (Pulp Test.)	1	Pulp & Paper 6 (Paper Test)	1
Pulp & Paper 11 (For. Chem.)	3	Pulp & Paper 11 (For. Chem.)	3
	19		18

## SENIOR YEAR

To be taken by students of Technical Properties of Wood.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Botany 5 (Wood Path.)	2	Bus. Law. 1 (Elements)	2
Economics 1 (General)	3	Entomology 4 (Wood Ent.)	2
Utilization 6 (Port. Mill.)	1	Utilization 19 (Uses of Wood)	2
Utilization 14 (Dry Kiln)	3	Wood Tech. 13 (Lab.)	1
Utilization 16 (Reg. Stud.)	3	Electives	10
Utilization 17 (Preservation)	3	Utilization trip during May	2
Wood Tech. 13 (Timb. Phys.)	2		19
Elective	2-3		
	19-20		



## SENIOR YEAR

To be taken by students in Conversion and Distribution.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Botany 5 (Wood Path.)	2	Entomology 4 (Wood Ent.)	2
Utilization 6 (Port. Mill.)	1	Mfg. & Man. 3 (Ind. Engr.)	2
Utilization 14 (Dry Kiln)	3	Mfg. & Man. 4 (Ind. Invest.)	2
Utilization 16 (Reg. Stud.)	3	Utilization 11 (Salesmanship)	2
Utilization 17 (Preservation)	3	Utilization 12 (Bus. Meth.)	3
Elective	6	Utilization 19 (Uses of Wood)	2
	18	Electives	5
		Utilization trip during May	2
			20

## SENIOR YEAR

To be taken by students in Pulp and Paper Manufacture.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Elec. Lab. 5 (Experiments)	1	Elec. Lab. 6 (Experiments)	1
Elec. Mach. 5 (Prin. Elec. Engr.)	3	Elec. Mach. 6 (Principles)	3
Heat & Power 1 (Steam Engines)	3	Mech. Lab. 3 (El. Mech. Lab.)	1
Pulp & Paper 7 (Coloring)	2	Pulp & Paper 8 (Org. & Man.)	1
Pulp & Paper 9 (Problem)	1	Pulp & Paper 10 (Problem)	3
Pulp & Paper 12 (Cellulose Chem.)	3	Pulp & Paper 12 (Cellulose Chem.)	3
Wood Tech. 4 (Wood Ident.)	2	Wood Tech. 4 (Wood Ident.)	2
Elective	3	Wood Tech. 5 (Fibers)	2
	18	Elective	3
			19

## Description of Courses in the College of Forestry

Note.—A numeral following the title of the course indicates the number of credit hours a week. A credit hour means one recitation (or lecture) hour per week. Three laboratory hours are equivalent to one credit hour. The roman numeral following the description indicates the semester in which the course is given.

GENERAL FORESTRY. 1. 2. This introductory course aims to develop a clear and broad concept of forestry. It covers the development of forestry throughout the world, and its relation to human affairs. Special consideration is given to the development of forestry in New York State.—I and II. Directed by Mr. Illick.

### Forest Botany

1. FOREST BOTANY. 3. Two hours of lecture. Three hours of laboratory. An elementary course throughout the first year dealing with structure and functions of plants and the fundamental problems of Botany, together with a general survey of the plant kingdom.—I and II. Messrs. Meier, Hirt, Percival, and assistants.

3. PLANT PHYSIOLOGY. 3. Lectures, recitations, and laboratory. A course designed to teach the fundamental physiological processes involved in growth of plants.—I. Messrs. Meier, Young and assistant. Prerequisite: Course 1.

4. TAXONOMY. 2. Lectures, recitations, laboratory and field-work. A course dealing with the fundamentals of plant classification.—II. Messrs. Young and Gottlieb. Prerequisite: Course 1.

5. WOOD PATHOLOGY. 2. Not given 1933-34.

11. GENERAL MYCOLOGY. 3. One hour of lecture. Four to six hours of laboratory. A course in the structure and life histories of fungi.—II. Mr. Hirt. Prerequisites: Courses 1 and 3.

12. FOREST PATHOLOGY. 3. Two hours of lecture. Three hours of laboratory. A course of lectures and laboratory work upon the diseases of plants in general with especial emphasis upon diseases of trees.—I. Mr. Hirt. Prerequisites: Courses 1 and 3.

13. CULTURE METHODS. 3. Six hours of laboratory and conference. A study of technique in the isolation and pure culture of fungi.—II. Mr. Hirt. Prerequisite: Course 12.

14. ADVANCED MYCOLOGY. 3. A year course in the classification of fungi.—I. Mr. Hirt. Prerequisite: Course 11.

15. ADVANCED FOREST PATHOLOGY. 3. One hour lecture. Six hours of laboratory. Individual studies in minor problems in Forest Pathology.—II. Mr. Hirt. Prerequisites: Courses 11 and 12.

16. ADVANCED PLANT PHYSIOLOGY. 3. A year course open to seniors and graduates. A consideration of the fundamental characteristics of living matter and life processes in plants. Hours to be arranged. Mr. Meier.

17. **ADVANCED TAXONOMY OF THE FLOWERING PLANTS.** 3. Two lectures and one laboratory period. An advanced course in which special attention is given to the taxonomy of natural groups closely related to forestry. Prerequisite: Course 4.—I. Mr. Young.

18. **PLANT ANATOMY AND TECHNIQUE.** 3. A course covering the essentials of plant anatomy other than wood, and the elements of technique required for such study.—I. Mr. Meier.

21. **RESEARCH IN FOREST BOTANY AND PATHOLOGY.** Elective for graduates.—I and II. Messrs. Bray, Meier, Hirt and Young.

## English

2. **ADVANCED COMPOSITION.** 2. The aim of this course is to give an intensive drill in the broader aspects of informative writing by means of assigned themes and class papers. Essays on many phases of contemporary thought are used as models.—I. Mr. Lee.

3. **TECHNICAL EXPOSITION.** 2. The aim of this course is to focus attention upon the use of English as employed by the professional man in the preparation of reports, technical and professional papers, and business correspondence.—II. Mr. Lee.

## Forest Entomology

1. **ELEMENTARY ENTOMOLOGY.** 2. Lectures, recitations and laboratory. A general course devoted to the study of morphology, life histories and general classification of insects.—II. Forest Zoölogy 1 is prerequisite for this course. Mr. Fletcher.

2. **FOREST ENTOMOLOGY.** 3. Two hours' lecture. Three hours' laboratory. Devoted to a study of insects of economic importance in Forestry.—I. Mr. MacAndrews. Course 1 is prerequisite.

3. **INSECTS AFFECTING SHADE TREES AND ORNAMENTAL SHRUBS.** 3. Two hours' lecture. Three hours' laboratory.—II. Mr. MacAndrews. Course 1 prerequisite.

4. **WOOD ENTOMOLOGY.** 2. Not given 1933-34.

11. **ELEMENTARY INSECT TAXONOMY.** 3.—I or II. Courses 1 and 2 are prerequisite. Mr. Fletcher.

12. **INSECT ANATOMY.** 3. A more detailed study of the anatomy of certain insects not studied in previous courses.—I or II. Mr. Fletcher.

13. **INSECT TAXONOMY.** 3. A more detailed study of classification of some particular groups of forest insects.—I or II. Mr. MacAndrews.

14. **INSECT HISTOLOGY.** 3. A study of the methods used in the preparation of insect material for microscopic study.—I or II. Mr. Fletcher.

15. **PROBLEMS IN FOREST ENTOMOLOGY.** 3. Individual study of small problems in forest entomology.—I or II. Mr. MacAndrews.

16. SEMINAR. 3. Library investigation, reports and discussion of forest insects of great economic importance. A study of the phases of entomology not covered in previous courses. Three hours' conference per week. By appointment.—II. Mr. MacAndrews.

17. INSECT ECOLOGY. 3. Three hours' lecture. A study of the various interacting environmental or habitat factors which influence the relative abundance and distribution of insects, and the practical application of ecological principles to problems in forest entomology. Field and Insectary methods of study. By appointment.—I. Mr. MacAndrews.

21. RESEARCH PROBLEMS IN FOREST ENTOMOLOGY. For graduate students.—I and II. Staff.

## Forest Management

3. PLANE SURVEYING. 3. Two hours' lecture. Three hours' field work. A preliminary course in the use of surveying instruments and field methods, mapping and office computations.—I and II. Mr. Sammi.

5. FOREST MENSURATION. 3. Three hours' lecture. A study of the measurements of volume of logs, trees and forest; estimating and mapping of timber, compilation of volume tables and collection of data in a detailed study of a forest area by stem analysis for purpose of predicting future possibilities.—II. Mr. Belyea.

6. FOREST FINANCE. 3. Three hours' lecture. The business aspects of forest management and the principles of economics and finance underlying the administration of forest properties.—II. Mr. Belyea.

11. FOREST REGULATION. 3. Three hours' lecture. Organization of forests for management. The normal and empirical forest, rotation and methods of regulating the cut.—I. Mr. Belyea.

12. APPLIED FOREST MANAGEMENT. 3. The application of management to specific forests and areas as demonstrated by actual practice in the United States.—II. Mr. Illick.

14. TOPOGRAPHIC SURVEYING. 3. One hour lecture. Six hours' field work. Methods of topographic mapping, by aneroid and pacing, transit and stadia, abney level and slope chain, plane table with telescopic alidade and trigonometric leveling.—II. Messrs. Illick and Sammi. Prerequisite: Summer Camp Engineering.

15. FOREST INCREMENT. 2. Two laboratory periods. A continuation of Forest Mensuration as applied to the principles of determining

16. FOREST ENGINEERING. 3. Two hours' lecture, three hours' field work. The application of engineering principles in the construction of trails, roads, bridges, logging railroads, chutes, flumes, dams, telephone lines, fire towers, cabins, etc., for the development and proper utilization of a forest.—I. Mr. Sammi.

17. FOREST ADMINISTRATION. 3. Given as Gen. For. 14, 1933-34.

18. FOREST ECONOMICS. 3. Not given 1933-34.
19. FOREST STRUCTURES. 3. Not given 1933-34.
20. FOREST LAW AND POLICY. 2. Given as Gen. For. 10, 1933-34.
21. MANAGEMENT PROBLEMS. Individual study of an assigned problem in Forest Management. Hours to be arranged.—I and II. Messrs. Illick and Belyea.
22. ADVANCED FOREST REGULATION. 3. Problems will be given the student with seminar consultation and outside reading.—II. Mr Belyea.

## Pulp and Paper Manufacture

*Special bulletin describing the work of the paper and pulp course may be obtained from the Registrar of the College.*

1. TECHNOLOGY. 3. Three hours' lecture. Study of the processes employed in the manufacture of pulp and paper.—I and II. Mr. Libby. Prerequisites or parallel courses: Chemistry 20 and 130.
2. TECHNOLOGY LABORATORY. 2. Six hours' laboratory. Laboratory demonstrations of the principles of pulp and paper manufacture described in Course 1.—I and II. Mr. Peterson. Prerequisite or parallel courses Pulp and Paper 1 and 3.
3. MACHINERY. 2. Three hours' lecture. Lectures on design, construction and operation of machinery used in the pulp and paper industry.—I and II. Mr. Peterson. Prerequisite or parallel courses: Physics 1 and P. and P. 1.
4. MILL ANALYSIS. 2. Six hours' laboratory. Evaluation of materials used in the manufacture of pulp and paper.—I and II. Mr. Peterson. Prerequisite or parallel courses: Chemistry 20 and 130 and P. and P.
5. PULP TESTING. 1. Three hours' laboratory. Physical and chemical properties of pulp. Oil and coal analysis.—I and II. Mr. Peterson. Prerequisites or parallel courses: P. and P. 4.
6. PAPER TESTING. 1. Six hours' laboratory. Physical, chemical and microscopical characteristics of papers.—II. Mr. Libby. Prerequisites or parallel courses: P. and P. 4.
7. COLORING. 2. Six hours' laboratory. Evaluation and identification of dyestuffs and the development of color formulas for dyeing pulp and paper.—I. Mr. Libby. Prerequisites or parallel courses: P. and P. 4.
8. MILL ORGANIZATION. 1. Lectures and seminar. A study of the organization and methods of administration of typical industrial enterprises with particular emphasis on the features of organization peculiar to the pulp and paper industry.—II. Mr. Libby.
9. PROBLEM. 1. A report covering a systematic survey of all available literature on some problem of interest to the pulp and paper industry.—I. Messrs. Libby and Peterson. Prerequisites or parallel



courses: Pulp and Paper Mfg. 1 to 5. Forest Chem. 2 and 11 and Chem. 20 and 130.

10. PROBLEM. 4. Laboratory development of the problem formulated in course 9.—II. Messrs. Libby and Peterson. Prerequisite: Pulp and Paper Mfg. 9.

11. FOREST CHEMISTRY. 3. Two hours' lecture and three hours' laboratory. This is primarily an elementary course in organic chemistry.—I and II. Prerequisites: Chemistry 1 and 20.

12. CHEMISTRY OF CELLULOSE. 3. Three hours' lecture. An elementary course in the chemical and physical properties and the use of cellulose and its derivatives.—I. Mr. Peterson. Prerequisites: Forest Chemistry 2.

13. CHEMISTRY OF LIGNIN. 2. Two hours' lecture (or seminar). Lecture will cover researches on the constitution, properties, and uses of cellulose and its derivatives. This is essentially a graduate course.—II. Mr. Peterson. Prerequisite: General Chemistry, Qualitative and Quantitative Analysis.

14. ANALYSIS OF WOOD. 3. Nine hours' laboratory. Quantitative proximate analysis of sound or decayed woods.—II. Mr. Peterson. Prerequisites: General Chemistry, Qualitative and Quantitative Analysis, Forest Chemistry 2 and Chemistry 11.

21. RESEARCH IN FOREST CHEMISTRY. Graduate elective. Hours to be arranged. Problems in forest chemistry and organic chemistry will be assigned to properly qualified graduate students.—I and II. Mr. Libby. Prerequisites depend upon the nature of the problem.

## Forest Recreation and Park Engineering

1. RECREATIONAL USES OF LAND AREAS. 3. Lectures, field trips or assignments. A general course covering the economic and social uses of land areas for recreational purposes.—I and II. Messrs. Welch and Francis.

2. DEVELOPMENT OF FOREST PARK RECREATIONAL AREAS. 3. One hour lecture. Six hours' laboratory. This course takes up the elements of structural design.—I and II. Mr. Francis.

3. PROJECTS IN FOREST RECREATION. 3. One hour lecture. Six hours' laboratory. A course taking up a study of some of the common problems in forest recreation and their logical solution.—I. Prerequisite: Forest Recreation 1. Mr. Francis.

4. ELEMENTS OF LANDSCAPE DESIGN. 3. Lectures and elementary drafting practice. Principles and history of Landscape Engineering.—I and II. Messrs. Cox, Arnold and Wagner.

5. LANDSCAPE ENGINEERING DESIGN. 4. Lectures and drafting practice in the preparation of original designs in Landscape Engineering.—I and II. Messrs. Cox, Arnold and Wagner. Prerequisite: Course 4.



6. LANDSCAPE ENGINEERING CONSTRUCTION. 3. Lectures, construction plans and estimates. Road design and pavement construction, grading and drainage details for various types of landscape engineering construction.—I and II. Messrs. Cox and Wagner. Prerequisite: Course 4.

7. CITY PLANNING. 3. Two hours' lecture and one hour reports and assigned reading. The economic, esthetic and engineering principles underlying modern city planning.—I. Messrs. Cox and Arnold.

8. PLANT MATERIALS. 3. Lectures, field trips, and preparation of planting plans. This course covers deciduous and evergreen shrubs, vines and perennials.—I and II. Mr. Arnold.

9. SHADE AND ORNAMENTAL TREES. 3. Three hours' lecture. Deciduous and evergreen trees used for ornamental purposes; their identification, pruning, use and care with especial reference to the details of city forestry practice. The subject of tree repair, or "tree surgery" is covered in the course.—II. Mr. Cox. Prerequisite: Course 4.

10. CAMPING TECHNIQUE. 3. Lectures, field trips and laboratory exercises. The details of camp technique, such as clothing and equipment, tents and supplies, portaging, packing, fires, cooking, etc.—I and II. Messrs. Welch, Arnold and Francis.

11. CAMP ADMINISTRATION AND MAINTENANCE. 3. Lectures, field trips and reports on the operation and management of organized camps. Statistics, budgets, camp location, health standards, camp diet, food supplies, etc.—I. Mr. Welch.

12. PROGRAM BUILDING FOR RECREATIONAL GROUPS. 3. Theory and practice of program building, camp crafts, games and amusements, sports, etc. Case studies in camp program with critical analyses.—I and II. Mr. Welch.

13. FOREST RECREATIONAL CAMPS. 3. One hour lecture. Six hours' laboratory. A study of the various types of camps being developed in forested areas for recreational uses.—II. Mr. Francis.

14. CAMP AND PARK STRUCTURES. 2. Lectures and drafting. The design and construction of general structures for camps and parks including walls, steps, dams, docks, water and sewage system, and simple buildings.—I and II. Mr. Wagner. Prerequisite: Course 4.

15. PARK ADMINISTRATION AND MAINTENANCE. 3. The theory and practice of organization for state, county and municipal park systems, park statics, park budgets, methods of acquisition of park lands, park legislation, etc.—II. Mr. Cox. Prerequisite: Course 4.

16. NATIONAL PARK PRACTICE. 2. Two hours' lecture. A brief history of the laws, practices and policies of the State and National Parks.—II. Mr. Francis.

17. EUROPEAN PRACTICE IN RECREATIONAL USES OF FORESTS. 3. Three hours' lecture. A study of practices in Germany, France and Switzerland.—I. Mr. Francis.

21. RESEARCH PROBLEMS IN FOREST RECREATION. Hours to be arranged.—I or II. Mr. Cox.

22. LANDSCAPE ENGINEERING DESIGN. 6. Advanced landscape engineering design for 5th year students. The major part of the course is devoted to a thesis with investigation and original design. Prerequisite courses: 1, 2, 3, 4, 5, and Architecture 2.—I and II. Messrs. Cox and Wagner.

23. LANDSCAPE ENGINEERING CONSTRUCTION. 4. Advanced landscape engineering construction. Original problems with specifications and estimates. Prerequisite courses: 1, 2, 3, 4, 5.—I and II. Messrs. Cox and Wagner.

24. ADVANCED CITY PLANNING. 4. Special problems in park and city planning design for 5th year students. Prerequisite courses: 1, 2, 3, 4, 5.—I and II. Mr. Cox.

## Silviculture

1. FOUNDATION OF SILVICULTURE. 3. Two hours' lecture; three hours' field work. An analysis of the site factors and their effect on forest vegetation. The relation of the forest to the site; the forest as a community.—I. Mr. McCarthy.

3. SEEDING AND PLANTING. 3. Two hours' lecture; three hours' laboratory. A course dealing with all phases of forest propagation especially by seeding and planting—II. Mr. Prichard.

4. PRACTICE OF SILVICULTURE. 3. Given during May at the Pack Demonstration Forest, Warrensburg, New York. Reproduction cuttings, intermediate cuttings, and cultural operations as used in this country and abroad.—II. Mr. Heiberg.

6. SILVICULTURE SYSTEMS. 2. Not given 1933-34.

11. FOREST PROTECTION. 3. Lectures and field work in the protection of forests from fire, wind, frost, animals, and other destructive agencies.—I. Mr. Prichard.

12. SILVICULTURAL SEMINAR. 2. Two hours' conference and discussion of silvicultural problems. Designed to give the students a thorough review of the literature on silviculture.—I. Mr. McCarthy.

13. EXPERIMENT STATION PROBLEMS. 3. Organization, supervision, opportunities, training, methods and results of silvicultural research. This course is intended to equip a student for carrying on research work in silviculture.—II. Mr. McCarthy.

14. REGIONAL STUDIES. 2. Silvicultural methods as applied in the management of the important species in the different forest regions of North America.—II. Mr. Heiberg.

15. FOREST SOILS. 2. Lectures, field, and laboratory work. Field identification of forest soils; the effect on the soil of silvicultural oper-

ations; the selection of species for planting on different soils, and methods of sampling and laboratory analysis.—I. Mr. Heiberg.

21. SILVICULTURAL RESEARCH. For graduate students. Hours to be arranged.—I and II. Messrs. McCarthy, Prichard and Heiberg.

## Wood Technology

1. ELEMENTARY DENDROLOGY. 3. Three credit hours each semester. Two hours' recitation or lecture; three hours' laboratory. Studies of the taxonomy and elementary silvics of woody plants, with special reference to the genera and species native to the Northeastern and other important forest regions of the United States.—I and II. Mr. Harlow.

2. ELEMENTARY DENDROLOGY. 3. Three credit hours first semester. Two hours' recitation or lecture; three hours' laboratory. Studies of the taxonomy and elementary silvics of the most important genera and timber species of the United States.—I. Mr. Harlow.

3. WOOD TECHNOLOGY. 3. Three credit hours first semester. One hour lecture and six hours laboratory. A study of the structural features of wood. Identification of woods by gross structure. The physical properties of wood of value in identification.—I. Mr. Brown. Prerequisite: Wood Technology 1.

4. WOOD TECHNOLOGY. 2. Not given 1933-34.

5. PAPER-MAKING FIBRES. 3. A morphological and taxonomic study of the fibres used in paper-making.—II. Mr. Forsaith. Prerequisites: Wood Technology 1 or 2, and 3 or 4.

11. ADVANCED HISTORICAL MORPHOLOGY. 3. Two hours' lecture, and three hours' laboratory. A study of the evolution of pre-historic and modern woody plants.—I or II. Mr. Forsaith.

12. THE MICROTECHNIQUE OF THE TISSUE OF WOODY PLANTS. 3. One hour lecture, and six hours' laboratory. Preparation of the tissues of woody plants for sectioning. The technique of sectioning, staining, and mounting. The theory and elementary chemistry of staining.—II. Mr. Harlow. Prerequisites: Wood Technology 1 or 2, and 3 or 4; also Pulp and Paper 11, except by special arrangement.

13. TIMBER PHYSICS. 3. Two hours' lecture and three hours' laboratory. A study of the physical and mechanical properties of wood including descriptive lectures, recitations and practical strength tests.—I lectures and II laboratory. Mr. Forsaith. Prerequisites: Wood Technology 2 and 4, and Physics 1.

14. COMMERCIAL TIMBERS OF THE WORLD. 3. One hour lecture, and six hours' laboratory and assigned reading. A survey of the more important commercial timbers of the world from the standpoint of structure, physical properties, identification, available supply, and uses.—II. Mr. Brown. Prerequisites: Wood Technology 1 or 2, and 3 or 4.

21. RESEARCH IN DENDROLOGY AND WOOD TECHNOLOGY. For graduate students. Hours to be arranged. Messrs. Brown, Forsaith and Harlow.

### Forest Utilization

1. LOGGING. 3. Three hours' lecture. History and development of the lumber industry and its relation to forestry. Detailed studies of logging and transportation. This course is supplemented by an inspection trip in May of the senior year.—I. Mr. Brown.

2. LUMBER MANUFACTURE. 3. Three hours' lecture. Considerable detail is devoted to the work and problems of manufacturing lumber.—II. Mr. Brown.

3. GLUES AND FINISHES. 2. Not given 1933-34.

4. FOREST PRODUCTS. 3. Three hours' lecture. A study of the so-called minor forest products such as veneer, paper pulp, cooperage, maple sugar, wood distillation, etc.—II. Mr. Blew.

6. PORTABLE MILLING AND WOODLOT LOGGING. 1. One hour lecture; three hours' laboratory for eight weeks. The principles and practice of portable mill work and intensive logging and utilization.—I. Mr. Henderson.

7. WOODWORKING MACHINERY. 2. Not given 1933-34.

11. LUMBER SALESMANSHIP. 2. Two hours' lecture. The principles underlying salesmanship with particular reference to lumber, and their application in the American lumber industry.—II. Mr. Hoyle.

12. BUSINESS METHODS IN THE LUMBER INDUSTRY. 3. Three hours' lecture. A review of particular problems affecting the marketing of lumber.—II. Mr. Brown.

13. AMERICAN LUMBER EXPORT TRADE. 2. Two hours' lecture. A study of export methods, ocean shipping, foreign finance and the present and future markets for American Lumber.—I or II. Mr. Brown.

14. DRY KILN ENGINEERING. 3. Two hours' lecture and three hours' laboratory. Consisting of a study of the theoretical and practical application of kiln drying of wood products.—I. Mr. Henderson.

15. ADVANCED DRY KILN ENGINEERING. 3. Conferences and laboratory work. A study of dry kiln problems of the wood-working industries.—I. Mr. Henderson.

16. REGIONAL STUDIES IN LOGGING AND MILLING. 3. Three hours' lecture. A detailed study will be made to supplement elementary course in Lumbering (Utilization).—I. Mr. Hoyle.

17. WOOD PRESERVATION. 3. Two hours' lecture and field trips. Wood preservatives and methods of treatment. Prerequisites: Wood Technology. I—I. Mr. Blew.



18. **ADVANCED WOOD PRESERVATION.** 3. The wood preserving industry. Construction and operation of wood preserving plants. Management and costs. Detained studies in the use of treated wood.—II. Mr. Blew. Prerequisite: Utilization 17.

19. **USES OF WOOD.** 2. Two hours' lecture. Commercial properties, adaptability, supply and utility of the principle American and foreign species manufactured into lumber.—II. Mr. Hoyle.

21. **SPECIAL PROBLEMS IN UTILIZATION.** Conferences and special library and laboratory research in the lumber and associated industries. Hours to be arranged.—I or II. Messrs. Brown, Henderson and Hoyle.

## Forest Zoology

1. **GENERAL ZOOLOGY.** 2. A course in the general principles of zoology. One hour lecture, three hours' laboratory.—I. Messrs. Johnson and Stegeman.

2. **FRESH-WATER FISHES.** 2. A course dealing with the identification, general biology and economics of inland fishes, including the principles of administration and management of fish resources. One hour lecture, three hours' laboratory.—I. Messrs. Johnson and Stegeman.

3. **ECOLOGY OF FRESH-WATER ANIMALS.** 3. A course designed to give the student some familiarity with the more important groups of fresh-water animals and their ecological relations. It includes also the principles of aquiculture and a study of the chief fresh-water fisheries and fishery products.—II. Prerequisite: Zool. 1.—II. Mr. Mueller.

4. **INVERTEBRATE ZOOLOGY.** 3. A study of the structure, classification and evolution of the invertebrates. A fundamental course prerequisite to any further study of problems relating to the invertebrates of the forest community.—I and II. Prerequisite: Zool. 1.—I and II. Mr. Mueller.

5. **PARASITES OF GAME.** 3. An introduction to the study of parasites and their relation to the diseases of game animals, including a brief survey of the classes of animal parasites from the protozoans to the arthropods.—I. Prerequisites: Zool. 4.—I. Mr. Mueller.

7. **GAME ANIMALS.** 2. Including not only the large and small game mammals of North America, but also the fur bearers and the predatory species and others that have important ecologic or economic relations, and dealing with their identification and habits. Special consideration given to the principles and theories underlying administration and management. One hour lecture, three hours' laboratory.—II. Messrs. Johnson and Stegeman.

8. **GAME BIRDS.** 2. The identification, general biology and ecology of the game birds of North America, native and introduced, with consideration also of enemy species. Special consideration given to the principles and theories of their proper administration and management. One hour lecture, three hours' laboratory.—II. Messrs. Johnson and Stegeman.

11. **PROBLEMS IN FOREST ZOOLOGY.** Elective. Hours to be arranged. Individual study, by qualified students, of special problems in forest zoology. Prerequisites: Nine hours of forest zoology, and such additional courses as the instructor in charge may deem necessary.—I and II. Messrs. Johnson and Mueller.

21. **RESEARCH IN FOREST ZOOLOGY.** Elective. Hours to be arranged. For graduate students only.—I and II. Messrs. Johnson and Mueller.

### Accessory Courses

The courses listed below are required of students registered in the College of Forestry, but are given in other colleges of the University.

**ACCOUNTING 21.** Elements of Accounting. 3. Given in the College of Business Administration. I.

**BOTANY 25.** Plant Genetics. 3. Given in the College of Liberal Arts. II.

**BUSINESS LAW 1.** Elements of Business Law. 2. Given in the College of Business Administration. I or II.

**CHEMISTRY 1.** General Chemistry. 4. Given in the College of Liberal Arts. I and II.

**CHEMISTRY 20.** Qualitative Analysis. 3. Given in the College of Liberal Arts. I and II.

**CHEMISTRY 130.** Quantitative Analysis. 3. Given in the College of Liberal Arts. I and II.

**DRAWING 1.** Lettering & Sketching. 1. Given in the College of Applied Science. I.

**DRAWING 2.** Mapping & Projections. 2. Given in the College of Applied Science. II.

**DRAWING 3.** Machine Design. 2. Given in the College of Applied Science. I.

**ECONOMICS 1.** Elements. 3. Given in the College of Liberal Arts. I and II, or I.

**ELECTRICAL LABORATORY 5.** Experiments. 1. Given in the College of Applied Science. I.

**ELECTRICAL LABORATORY 6.** Experiments. 1. Given in the College of Applied Science. II.

**ELECTRICAL MACHINERY 5.** Principles of Electrical Engineering. 3. Given in the College of Applied Science. I.

**ELECTRICAL MACHINERY 6.** Principles of Electrical Engineering. 3. Given in the College of Applied Science. II.

**ENGLISH 1.** Freshman English. 3. Given in the College of Liberal Arts. I and II.

**GEOLOGY 36.** General Geology. 3. Given in the College of Liberal Arts. I.



**GEOLOGY 32.** Geomorphology. 3. Given in the College of Liberal Arts. I and II.

**GEOLOGY 103.** Paleontology. 3. Given in the College of Liberal Arts. I and II.

**HEAT and POWER 1.** Steam Engines. 3. Given in the College of Applied Science. I.

**MATHEMATICS 1.** Unified Mathematics. 3. Elements of College Algebra, Trigonometry and Analytic Geometry. Given in the College of Liberal Arts. I.

**MATHEMATICS 3.** Analytic Geometry. 3. Given in the College of Applied Science. I.

**MATHEMATICS 4.** <sup>u.s.</sup> Differential Calculus. 3. Given in the College of Applied Science. I.

**MATHEMATICS 5.** Integral Calculus. 3. Given in the College of Applied Science. II.

**MATHEMATICS 104.** Differential Calculus. 3. Given in the College of Liberal Arts. I or II.

**MATHEMATICS 105.** Integral Calculus. 3. Given in the College of Liberal Arts. I or II.

**MECHANICAL LABORATORY 3.** Elements of Mechanical Laboratory. 1. Given in the College of Applied Science. II.

**PHYSICS 1.** General Physics. 4. Given in the College of Liberal Arts. I and II.

**PHYSICS 5.** Topics of Physics. 3. Given in the College of Liberal Arts. I and II.

**SOILS 1.** Soils. 3. Required of juniors in Groups I, II, and IV. Given in the College of Agriculture. II.

**SPEECH 14.** Public Speaking. 3. Required of seniors in Groups I, II, III, V and VI; sophomores in Group VII. Given by the School of Public Speech and Dramatic Art. I or II.



BULLETIN  
OF  
**The New York State  
College of Forestry**

AT  
SYRACUSE UNIVERSITY

SAMUEL N. SPRING, Dean

*Announcement of Courses*



1934 - 1935

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## CALENDAR FOR 1934-35

### *FIRST SEMESTER*

- July 2-Sept. 8..Sophomore Summer Camp at Cranberry Lake  
Sept. 10-Sept. 22..Pre-freshman Camp at Cranberry Lake  
Sept. 24-Sept. 26..Registration for first semester  
Sept. 27.....Beginning of classes  
Nov. 13.....Meeting of Trustees  
Nov. 20.....Middle of first semester  
Nov. 29.....Thanksgiving day  
Dec. 22-Jan. 7...Christmas vacation (Saturday noon to Monday A.M.)  
Jan. 25-Jan. 31...Mid-year examinations

### *SECOND SEMESTER*

- Feb. 1-Feb. 5....Registration for second semester  
Feb. 6.....Beginning of classes  
Mar. 23.....Middle of second semester  
Mar. 23-Apr. 1..Spring vacation  
May 24-May 31..Final examinations  
June 2.....Baccalaureate service  
June 3.....Commencement



# TRUSTEES OF THE NEW YORK STATE COLLEGE OF FORESTRY

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## FACULTY OF THE NEW YORK STATE COLLEGE OF FORESTRY

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*Professor of Forest Utilization*

HARRY P. BROWN, A.B., A.M., PH.D.

*Professor of Wood Technology*

HENRY R. FRANCIS, B.S., M.S.F.

*Professor of Forest Recreation*

JAMES F. DUBUAR, A.B., M.F.

*Professor of Forestry; Director of New York State Ranger School*

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*Professor of Landscape Engineering*

LOUIS E. WISE, A.B., PH.D.

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CARLYN C. DELAVAN, A.B., M.S.F.

*Professor of Forest Engineering and Director of Summer Camp*

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*Professor of Forest Zoology; Director of Roosevelt Wild Life Station*

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EDWARD F. McCARTHY, B.S., M.S.

*Professor of Silviculture*

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*Associate Professor of Timber Physics*

HIRAM L. HENDERSON, A.B.

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HAROLD C. BELYEA, A.B., A.M., B.Sc.F., M.F.

*Associate Professor of Forest Engineering*

SVEND O. HEIBERG, A.B., M.Sc.F., M.F.

*Associate Professor of Silviculture*

ALAN F. ARNOLD (Landscape Architecture, Harvard, 1904-08)

*Assistant Professor of Landscape Engineering*

RAYMOND J. HOYLE, B.S., M.S.

*Assistant Professor of Forest Utilization*

ISAAC LAURANCE LEE, A.B., M.F., A.M.

*Assistant Professor of English; Registrar*

RAY R. HIRT, B.S., M.S., PH.D.

*Assistant Professor of Forest Botany*

CLIFFORD H FOSTER, B.S. M.S., M.F.

*Assistant Professor of Forestry; Director of Pack Demonstration Forest*

WILFORD A. DENCE, B.S.

*Assistant Professor; Assistant Director of Roosevelt Wild Life Station*

JUSTUS F. MUELLER, A.B., A.M., PH.D.

*Assistant Professor of Forest Zoology*

C. EUGENE FARNSWORTH, B.S.F., M.F.

*Assistant Professor in Ranger School*

AUBREY H MACANDREWS, B.S., M.S.

*Assistant Professor of Forest Entomology*

VERNON A. YOUNG, B.S., M.S., PH.D.

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*Assistant Professor of Forest Chemistry*

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*Assistant Professor of Wood Technology*

LEROY C. STEGEMAN, B.S., M.S.

*Instructor in Forest Zoology*

P. J. HADDOCK

*Instructor in Ranger School*

J. OSCAR BLEW, JR., B.S., M.S.

*Instructor in Wood Utilization*

FLOYD E. CARLSON, B.S.F., M.F.

*Instructor in Forest Extension*

JOHN C. SAMMI, B.S., M.F.

*Instructor in Forest Engineering*

STERLING R. WAGNER, B.S., M.L.E.

*Instructor in Landscape Engineering*

RAY F. BOWER, B.S., M.S.

*Instructor in Forest Extension*

ORRIN L. LATHAM, B.S.F.

*Instructor in Ranger School*

FRED W. FLETCHER, A.B., M.A.

*Instructor in Forest Entomology*

HOWARD W. MORGAN, B.S., M.S.

*Instructor in Pulp and Paper Manufacture*

WALTER W. CHIPMAN, B.S., A.M.

*Treasurer*

ELEANOR CHURCH, B.L.E.

*Librarian*





# THE NEW YORK STATE COLLEGE OF FORESTRY

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## Establishment and Purposes

The New York State College of Forestry at Syracuse University was established in 1911 by the Legislature of the State of New York. As set forth in its charter, the College of Forestry has for its objects and purposes the teaching and instruction of students in the science and practice of forestry and its several branches; the carrying on and promotion of investigation, experiment and research in forestry and its several branches; the conduct upon land acquired by purchase, gift, or lease for such purpose, of experiments in forestation, reforestation, the development of forests for public, commercial and recreational purposes, the protection of watercourses and subterranean waterflow, the protection and propagation of the animal life of the forest and forest waters, and, generally, the giving of popular instruction and information concerning the elements of forestry, the effective marketing of forest products, and practical tree-planting throughout the State; the planting, raising, cutting and selling of trees and timber with a view to obtaining and imparting knowledge concerning the scientific management and use of forests, their regulation and administration, and the production, harvesting and reproduction of forest crops and the earning of revenue therefrom.

## Buildings

In 1913 an appropriation of \$250,000 was made for a forestry building to be located on the campus of Syracuse University. This building was completed and ready for occupancy at the beginning of the second semester of the college year, 1916-17. In June 1933 this building was named Bray Hall in honor of Dr. William L. Bray of Syracuse University, who acted as first Dean of the College.

The Legislature of 1930 appropriated \$600,000 for a new forestry science building which is located on the campus of Syracuse University near Bray Hall and has been in service since February, 1933. This building has been named the Louis Marshall Memorial in honor of Louis Marshall, the first chairman of the Board of Trustees and who served in this office until his death in 1929.

A new sawmill and pulp and paper laboratory were added in 1932 to the group of buildings now on the campus of Syracuse University.

## **Facilities for Instruction**

The College of Forestry is adequately equipped with apparatus for laboratory work in Utilization, Forest Botany, Forest Pathology, Wood Technology, Forest Entomology, Silviculture and Forest Soils, Forest Zoology and Wild Life, and for experimental work in Pulp and Paper manufacture. The College is equipped with instruments for field work in Forest Management and surveying. Provision is made for drafting and design work in connection with Landscape and Recreational Management.

The Franklin Moon Memorial Library commemorates the service of Dean Moon who was head of the College from 1920 until he died in 1929. This library contains over 11,000 volumes and over 25,000 pamphlets covering all phases of forestry and the sciences having a bearing on forestry.

Additional library facilities are available through access to the libraries of Syracuse University as well as the Public Library of the city of Syracuse.

## **Training in the State Ranger School**

The New York State Ranger School, one of the departments of the New York State College of Forestry, is located on the Ranger School forest of 2,333 acres in the western Adirondacks near Wanakena.

The Ranger School gives a practical course of one year which trains men for such positions as forest guard, forest ranger, tree planting expert and nursery foreman. The work is largely of a practical, intensive nature along the lines of timber estimating, forest surveying, mapping and scaling; the carrying out of various methods of logging and lumbering, nursery practice and tree planting.

For further information write The Director, New York State Ranger School, Wanakena, N. Y.

## **Public Service in Forestry**

This consists of:

Instruction, advice and information by means of lectures, motion pictures, magazine and press articles, photographs and correspondence.

Issuing technical bulletins and leaflets embodying results of research and investigation in forestry; informative publications for popular consumption.

Special service to producers and consumers of forest products through special market investigations and studies of closer utilization of waste material.

Advice to individuals, institutions and municipalities on forestry problems.

For further information regarding public service, write The Director, Extension Service, College of Forestry, Syracuse, N. Y.

## College Properties

### THE SYRACUSE FOREST EXPERIMENT STATION

This station is located in the southern part of the city of Syracuse and consists of a total area of 93 acres made up of two farms purchased and consolidated in the spring of 1912. Since 1912 experimental nursery and plantation work has been conducted on the area. A 30 acre natural wood is also located here and is utilized for demonstration purposes.

### THE SALAMANCA FOREST

This tract, acquired in 1912, consists of 1,036 acres and is located south of Salamanca in Cattaraugus County, adjacent to the Allegany State Park. The forest is a mixed stand of hardwoods consisting of aspen, chestnut, oak and maple. Experimental thinnings have been made and several plantations established in the open portions of the tract. A plan of management has been prepared.

### THE RANGER SCHOOL FOREST

In 1912 the Rich Lumber Company of Wanakena, N. Y., presented to Syracuse University, in trust for the use of the New York State College of Forestry for forestry purposes, a tract of 1,817 acres of cut-over land lying along the West Inlet Flow of Cranberry Lake in the Adirondacks near Wanakena, St. Lawrence County. In December, 1929, the International Paper Company gave an adjoining tract of 516 acres to be added to this forest, making the total area 2,333 acres. A forest management plan has been prepared. The area is typical of the cut-over land found in northern New York. The Ranger School Forest is used principally by the students of the State Ranger School. A branch United States Weather Station has been established on the forest.

### THE CHARLES LATHROP PACK EXPERIMENTAL FOREST

In 1923 Charles Lathrop Pack presented to Syracuse University, in trust for the use of the New York State College of Forestry, a tract of 964 acres, situated on Cranberry Lake, known as the "Barber tract" and on which, since 1915, the College of Forestry Summer Camp has been held. This area serves as a laboratory for the students and is a permanent camp where 10 weeks practical experience in field methods is given to sophomores each summer. Adjoining this tract and available for field demonstration are State lands included within the Adirondack Park.

### THE CHARLES LATHROP PACK DEMONSTRATION FOREST

In the spring of 1927 an area of 2,250 acres was presented by the Charles Lathrop Pack Forestry Trust to Syracuse University in trust for the use of the New York State College of Forestry. This Forest is in the Lake George-Warrensburg region and is located about 3 miles north of

Warrensburg on the main highway between New York City and Montreal. A management plan has been prepared for this tract. The Forest serves also as a field laboratory for the study of silviculture and other forest problems. A camp of four weeks is maintained here in the spring of Junior year for students majoring in Forest Management, Game Management, Forest Pathology or Forest Entomology. A permanent resident forester is in charge of the forest.

### THE ARCHER AND ANNA HUNTINGTON WILD LIFE FOREST STATION

In 1932, Archer Milton Huntington and his wife, Anna Hyatt Huntington, presented to Syracuse University, in trust, for the use of the New York State College of Forestry, a tract of forest land comprising 13,000 acres in the Central Adirondacks near the village of Newcomb, Essex County. Catlin and Rich Lakes, and a number of smaller lakes and streams are within the forest boundary. In the deed of gift from Dr. and Mrs. Huntington is contained the covenant that "the said premises will be used for investigation, experiment and research in relation to the habits, life histories, methods of propagation, and management of fish, birds, game, food and fur-bearing animals, and as a forest of wild life."

### Short Course

A special short course covering instruction in kiln drying is given annually at the College. This synoptical course is designed primarily for men actively engaged in the industry.

Requests for detailed information about this course should be addressed to the Department of Wood Utilization, College of Forestry, Syracuse, N. Y.

### Publications

From time to time the College issues technical publications, bulletins and leaflets on various forestry subjects and problems. A list of such publications will be sent free on application. Most of the popular publications are for free distribution, while a small charge is made for the technical and some of the more formal bulletins.

The News Letter is published quarterly by the College and carries items on the work of the College, news of its Alumni and information of general interest to foresters.

Applications for publications should be addressed to the Director of Forest Extension, New York State College of Forestry, Syracuse University, Syracuse, N. Y.

### Communications

All general correspondence should be addressed to the Dean. Inquiries and correspondence concerning entrance should be addressed to the Registrar of the New York State College of Forestry, Syracuse University, Syracuse, N. Y.



# GENERAL INFORMATION

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## Expenses

All bills *except* those for dormitory rooms and board are payable to W. W. Chipman, Treasurer, New York State College of Forestry, Syracuse, N. Y. Checks should be drawn payable to W. W. Chipman, Treasurer.

Payments for dormitory rooms and board are due Syracuse University and such checks should be drawn payable to Treasurer of Syracuse University.

## MATRICULATION

Every student on entering the University is required to pay a matriculation fee of \$10.00. This fee is not required of students passing from one college to another within the University or of students transferring from another institution if evidence is submitted that such a fee was paid in the former institution. This fee is paid at the time of registration for the fall semester.

## FEES

All fees for instruction and incidentals are payable twice a year, on or before the first day of each semester. The treasurer's receipt admits to classes.

Students who, for at least twelve months prior to entering the College, have been bona fide residents of the State of New York are exempt from payment of tuition; provided, however, that no student shall be allowed to transfer from the College of Forestry to another college in Syracuse University wherein tuition is charged without first paying \$7.00 per hour for the hours for which he may receive credit in the latter college, with the understanding that from the above amount shall be deducted whatever amount has been collected and retained by the College of Forestry for tuition and fees.

Tuition per year (non-residents).....	\$200.00
Matriculation (paid once).....	10.00
Sophomore Summer Camp (paid once) not including board..	25.00
Library Deposit (returnable) .....	5.00

## PER SEMESTER

General Fee, first semester.....	\$30.00
General Fee, second semester.....	15.00
Student Activities .....	2.75
Student Loan Fund and Alumni Association (Sophomore year only) .....	1.00
Laboratory Fees (all undergraduates).....	20.00
Laboratory Fees (graduates).....	25.00
Pulp and Paper students \$10 per semester in addition to regular fee beginning first semester junior year.	
Diploma Fee (paid at time of graduation).....	10.00

From time to time additional expenses are incurred in connection with special trips and camp periods.

## DORMITORIES

All bills covering residence in dormitories are payable at the office of the University Treasurer. Checks should be drawn payable to Treasurer of Syracuse University. In case payment is not made within two weeks of the time it is due, the student is automatically suspended.

An advance deposit of \$10.00 must be paid by each student when room is engaged or reserved, which will be credited upon the first term's bill and will be refunded in case the student does not become or remain a student in the University, provided the room is given up before September 1.

Rental for room is payable one-half at the beginning of each semester, and no refund is made unless a substitute is obtained acceptable to the University. Board is payable quarterly in advance on or before September 20, November 20, February 1, April 1. If a student for good and sufficient reasons is obliged to leave the University, the portion of board unused will be refunded.

Students may re-engage rooms occupied by them for the following year provided that applications are made prior to April 1, but such rooms will not be held longer than May 15 unless contracts are signed and deposits paid by that date.

Furniture and bed linen are supplied by the University; students must supply their own towels, curtains, rugs and pictures.

Board and room in Sims Hall is \$400 a year, including heat and light. Men wishing information on Sims Hall should address Men's Personnel Office, Syracuse University, Syracuse, N. Y.

Students not in the dormitory or chapter houses must live in houses approved by the University. A list will be sent on request from the Men's Personnel Office. On arrival the student should be sure that he is in an approved house by demanding to see the "Certificate of Approval." This will avoid the necessity of moving at a later date. Students are urged to reserve rooms before September 1. For any information regarding the living conditions, address Men's Personnel Office, Syracuse University.



## Self-Support

Many students attend Syracuse University who earn all or a part of their expenses. The earning of board and lodging is not an extremely difficult matter. Only the most brilliant students, however, can expect to earn their total expenses and maintain satisfactory grades.

The Appointment Office in the Administration Building of Syracuse University assists students in securing self-support work. Prospective students may write to the Appointment Office stating the type of work they would like to secure and stating the experience they have had in this work.

## THE CHARLES LATHROP PACK PRIZES

The Charles Lathrop Pack Foundation was established in 1923 by Charles Lathrop Pack, President of the American Tree Association, to encourage students in educational institutions in arousing public interest in forestry and to advance forestry education among the people. One hundred dollars derived from this foundation is divided annually among the students who participate in two contests—one in essay-speaking competition, the other a debate.

## THE BOY SCOUT SCHOLARSHIP

Through arrangements made with the National Headquarters of the Boy Scouts of America, the College awards each year a scholarship equal to \$150 in cash to the Boy Scout in the State of New York who is considered most worthy of this honor. A Scout who desires to become an applicant for the scholarship should secure an application blank from the Registrar of the College, fill in the blank, and then return the application to the Registrar properly endorsed by his local Council Executive. The application will then be recorded and sent to the Regional Director of Scouts for his recommendation. The Scout will be notified by the College of the result of his application. The Scout's scholastic record and photograph should accompany the application.

In order to retain a scout scholarship through the four-year course, an average of "C" for all work is required.

## Physical Training

Good health is necessary to attain high scholarship in college and to perform successfully the duties of later life. With this end in view considerable stress is laid upon well-regulated physical training. Every undergraduate student in the College of Forestry is required to take systematic exercise, including swimming in the gymnasium, during the first year of the course unless physically unable to engage in it.

A medical examination is given every student when he enters upon gymnasium work and his exercises are adapted to the requirements of his health and to the development of a sound body.

The athletic interests of the University are in the hands of the Athletic Association. All business is transacted through the Athletic Governing Board, which includes representatives from the faculty, alumni, students, and interested business men of the city.

## Requirements For Admission

Students applying for admission to the New York State College of Forestry must be graduates of an accredited high school or preparatory school, and must offer a minimum of 15 units of preparatory work of high school grade as indicated below:

	<i>Units</i>
English (four years).....	3
History (Ancient, Medieval, English, American, or Modern).....	1
Mathematics .....	2½
(All applicants must have completed courses in elementary and intermediate algebra, and plane geometry)	
Language (Latin, French, German, or Spanish).....	2
Science .....	1
Elective .....	5½
subjects listed above; or in Freehand and Mechanical Drawing; Carpenter Shop or Foundry; Economics; Agriculture. Credit cannot be granted for purely commercial subjects like stenography or typewriting, commercial arithmetic, or business writing.)	
Total .....	15

A unit is considered to be the equivalent of five recitations per week for one year in one branch of study. Two to three hours of laboratory, drawing or shop work count as equivalent to one hour of recitation.

No applicant will be considered eligible for admission who has had less than 15 units of preparatory work. However, in cases where an applicant may offer courses which do not cover the requirements specified above, he may be considered eligible provided he is not deficient in more than one unit of the above requirements; but no applicant will be considered eligible for admission if deficient in more than one unit.

In addition to a unit count, an applicant to be considered eligible for admission to the College of Forestry must show also a quality standard of preparatory work. This standard is based upon Regents grades of 70 per cent or better for acceptance of courses for entrance credit. Where courses are offered in which a Regents grade is not given, then a school grade of 75 per cent or better is required.

The College in maintaining a high standard of work believes that satisfactory college work can be done only after very thorough preparation in the lower schools. It believes also that there are few lines of work which require a broader foundation or more thorough training than the profession of forestry and that there is no short-cut to the profession. The College urges every young man who is considering the study of forestry to make up his mind to spend all the time necessary for thorough preparation for college work.

Freshmen are accepted *only* at the beginning of the fall semester.

## UNDERGRADUATE WORK

The curriculum is divided into two major divisions, I and II (see Chart, page 21). Division I deals primarily with the forest, and Division II with the products. At the end of the freshman year, each student must choose the division in which he wishes to pursue the balance of his course. He should be able to decide whether he wishes to make his life work concerned with the handling of the growing forest, or with the utilization and distribution of its products.

### Division I

This division is further separated into two groups: Forest and Game Management, and Landscape and Recreational Management. The former group emphasizes forest production and trains men for positions as forest and game managers with the United States Forest Service, Forest Service work in the various states, or as forest and game managers for private forest enterprises. There is opportunity also for specialization in Forest Entomology and Forest Pathology. The second group emphasizes landscape and recreational use of the forest and trains men for positions with state and national parks and private recreational activities.

### Division II

This division emphasizes the industrial aspect of utilization, manufacturing and distribution of the products of the forest, and trains men in preparation for positions found largely in connection with private industries such as lumber companies, wood-working industries, and pulp and paper mills. (For further information on pulp and paper manufacture, write for special circular).

## GRADUATE WORK

An opportunity for graduate work is provided at the New York State College of Forestry at Syracuse University in professional and scientific lines leading to the appropriate advanced degree.

This work may be done in the professional fields of forest management, silviculture, the lumber industry, wood technology, paper and pulp manufacture, park engineering and recreational use of the forest, and like professional and business phases, or it may be within the scientific fields of botany, entomology, zoology, chemistry or similar lines. For the Ph.D. degree scientific work is required of a character conforming to recognized standards.

The program of a graduate student is determined by the professors constituting the committee under whose direction the work is to be carried out. Graduate instruction under professors in the other colleges of Syracuse University may be included in the candidate's program by direction of his committee. Only students of satisfactory grade in scholarship will be accepted. Applicants for admission to graduate work must have received a Bachelor's degree from an institution of recognized standing and have had substantially the same training in forestry as is given in the New York State College of Forestry. If the applicant has not had such undergraduate training his rating and program will be determined in each case by the committee on advanced standing in consultation with the head of the department concerned with the field in which he desires to specialize.

Applicants for graduate work should address correspondence to: The Chairman of the Graduate Committee, New York State College of Forestry, Syracuse, N. Y.

# CHART SHOWING ORGANIZATION OF COURSES

## Division I THE FOREST

Forest and Game  
Management

SENIOR YEAR MAJORS		
Forest Management	Game Management	Forest Entomology and Pathology

JUNIOR

SOPHOMORE

Landscape and Recreational  
Management

SENIOR YEAR MAJORS		
Landscape and Park Engineering	Forest Recreation	Arboriculture

JUNIOR

## Division II FOREST PRODUCTS

Technical and Administrative  
Utilization

SENIOR YEAR MAJORS		
Technical Properties of Wood	Conversion and Distribution	Pulp and Paper Manufacture

JUNIOR

JUNIOR

JUNIOR

SOPHOMORE

FRESHMAN

## Program of Courses

For sequence of years see Diagram of Courses on page 21. For description of courses, see page 28.

### FRESHMAN YEAR

To be taken by all students

<i>First Semester</i>		<i>Second Semester</i>	
	<i>Credit Hours</i>		<i>Credit Hours</i>
Forest Botany 1a (Introd.).	3	Forest Botany 1b (Introd.)	3
Chemistry 1 (Gen. Inorganic)	4	Chemistry 1 (Gen. Inorganic)	4
Drawing 1 (Lettering & Sketch)	1	Drawing 7 (Mech. Draw.)	2
English 1 (Freshman Engl.)	3	English 1 (Freshman Engl.)	3
Gen. Forestry 1a (Introd. to For.)	2	Gen. Forestry 1b (Introd. to For.)	2
Mathematics 4 L.A. (Unified Math.)	3	Mathematics 4 L.A. (Unified Math.)	3
	<u>16</u>		<u>17</u>

After freshman year, all students must make choice of Divisions for subsequent courses.

### DIVISION I

#### SOPHOMORE YEAR

<i>First Semester</i>		<i>Second Semester</i>	
	<i>Credit Hours</i>		<i>Credit Hours</i>
Forest Botany 3 (Plant Physiol.)	3	Forest Botany 4 (Plant Taxonomy)	2
English 3 (Composition & Lit.)	2	English 5 (Tech. Exposition)	2
For. Man. 1a (Surveying)	3	Entomology 1 (Elem. Ent.)	2
Physics 5a (Topics of Physics)	2	For. Man. 1b (Surveying)	3
Speech 14 (Pub. Speaking)	2	For. Man. 2 (Mensuration)	3
Wood Tech. 1a (Dendrology)	3	Physics 5b (Topics of Physics)	2
Forest Zoology 1 (Gen. Zool.)	2	Wood Tech. 1b (Dendrology)	3
	<u>17</u>		<u>17</u>

#### SUMMER CAMP

Situated on Cranberry Lake in the Adirondacks. Begins the first week in July and runs for 10 weeks. Prerequisite: For. Man. 1, 2; Botany 4; Wood Tech. 1.

The program of the summer camp gives field training in forest botany, in surveying and mapping, and in mensuration as a natural complement of the class and laboratory work of the Sophomore year. The work in silviculture is basic for the courses in the Junior year. For satisfactory completion of the work the following credits are given:

	<i>Credit Hours</i>
Dendrology	$\frac{1}{2}$
Ecology & Taxonomy	1
Silviculture	1
Surveying	$3\frac{1}{2}$
Mensuration	$3\frac{1}{2}$
Manual Arts	$\frac{1}{2}$
	<u>10</u>



## JUNIOR YEAR

To be taken by students in Forest Management, Game Management,  
Forest Entomology and Forest Pathology.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Economics 1 (General)	3	*Forest Botany 11 (Mycology)	3
Entomology 2 (For. Ent.)	3	For. Man. 3 (Mapping Technique)	1
Geology 36 (For. Geol.)	3	For. Man. 10 (For. Econ.)	3
Silviculture 1 (Found. Silv.)	3	Silviculture 3 (Seed & Plant.)	3
Utilization 1 (Logging)	3	**Silviculture 4 (Practice)	4
Wood Tech. 3 (Wood Ident.)	3	Soils 1 (Prop. of Soils)	3
	18	Utilization 2 (Lbr. Mfg.)	3
		Utilization 4 (For. Products)	3
			20

\* To be taken by Entomology and Pathology students only, instead of Utilization 4.

\*\* Field work given at Pack Forest, Warrensburg, N. Y. during May.

## JUNIOR YEAR

To be taken by students in Landscape and Recreational Management.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Economics 1 (General)	3	Entomology 3 (Shade Tree Insects)	3
Geology 36 (For. Geol.)	3	L.E. 1b (Elem. Design)	3
L.E. 1a (Elem. Design)	4	For. Man. 3 (Mapping Technique)	1
Silviculture 1 (Found. of Silv.)	3	Silviculture 3 (Seed. & Plant)	3
<i>And (L.E. Group)</i>		Zoology 2 (Fish & Game)	3
Architecture 2 (Elements)	2	<i>And (L.E. Group)</i>	
L.E. 2a (Plant Materials)	3	Architecture 2 (Elements)	2
	18	L.E. 2b (Plant Materials)	3
<i>Or: (Rec. Group)</i>		Pencil Technique	1
F.R. 1a (Rec. Devel.)	3		19
F.R. 2a (Camp. Tech.)	3	<i>Or: (Rec. Group)</i>	
	18	F.R. 1b (Rec. Devel.)	3
<i>Or: (Arboriculture Group)</i>		F.R. 2b (Camp. Tech.)	3
L.E. 2a (Plant Materials)	3		18
Wood Tech. 3 (Wood Ident.)	3	<i>Or: (Arboriculture Group)</i>	
	18	L.E. 2b (Plant Materials)	3
		Soils 1 (Prop. of Soils)	3
			18

## SENIOR YEAR

To be taken by students in Forest Management.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
For. Botany 12 (For. Pathology)	3	For. Man. 4 (Roads & Trails)	3
For. Man. 7 (For. Finance)	3	For. Man. 5 (For. Structures)	3
For. Man. 11 (Adv. Mensuration)	2	For. Man. 6 (Regulation)	3
For. Man. 12 (Adm. & Policy)	3	For. Man. 13 (For. Accts. & Records)	3
Silviculture 11 (Protection)	3	Utilization 19 (Uses of Wood)	2
Silviculture 14 (Reg. Silv.)	2	Elective	3
*Silviculture 16 (Field trip)	2		17
	18		

\* Field trip only; see description of course.

## SENIOR YEAR

To be taken by students in Game Management.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
For. Botany 12 (For. Pathology)	3	For. Man. 6 (Regulation)	3
For. Man. 12 (For. Adm. & Policy)	3	For. Recreation 1b (Rec. Devel.)	3
For. Recreation 1a (Rec. Devel.)	3	Zoology 3 (Ec. of Fr. Water Animals)	3
Silviculture 11 (Protection)	3	Zoology 4b (Invertebrates)	3
Zoology 4a (Invertebrates)	3	Zoology 7 (Game Mammals)	2
Zoology 5 (Parasites of Fish & Game)	3	Zoology 8 (Game Birds)	2
Zoology 6 (Fish)	2	Elective	3
	20		19

## SENIOR YEAR

To be taken by students in Forest Entomology and Forest Pathology

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
For. Botany 12 (For. Pathology)	3	For. Botany 15 (Adv. Path.)	3
Entomology 11 (Taxonomy)	3	Entomology 15 (Seminar)	3
Entomology 12 (Anatomy)	3	Botany 25 (Genetics)	3
For. Man. 11 (Adv. Mensuration)	2	Elective	10
For. Man. 12 (For. Adm. & Policy)	3		19
Silviculture 11 (Protection)	3		
Elective	3		
	20		

## SENIOR YEAR

To be taken by students in Landscape and Recreational Management.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
L.E. 3a (Land. Eng. Design)	6	L.E. 3b (Land, Eng. Design)	6
L.E. 7a (Camp & Park Struct.)	3	L.E. 7b (Camp & Park Struct.)	3
<i>In Addition: (L.E. Group)</i>		<i>In Addition: (L.E. Group)</i>	
L.E. 4a (Construction)	3	L.E. 4b (Construction)	3
L.E. 5 (City Planning)	3	L.E. 6 (Shade Trees)	3
Pencil Technique	1	L.E. 8 (Park Admin.)	3
Silviculture 6 (Silviculture)	2		18
	18	<i>Or: (Rec. Group)</i>	
<i>Or: (Rec. Group)</i>		F.R. 4 (Nat. Park Prac.)	3
F.R. 3 (Camp Admin.)	3	Phys. Ed. 9 (Teach. Meth. Phys. Ed.)	3
F.R. 5 (European For. Rec.)	3	Elective	3
Phys. Ed. 9 (Teach. Meth. Phys. Ed.)	3		18
	18	<i>Or: (Arboriculture Group)</i>	
<i>Or: (Arboriculture Group)</i>		L.E. 4b (Construction)	3
For. Botany 12 (For. Path.)	3	L.E. 6 (Shade Trees)	3
L.E. 4a (Construction)	3	Elective	3
L.E. 5 (City Planning)	3		18
	18		

## DIVISION II

## SOPHOMORE YEAR

To be taken by students in Technical and Administrative Utilization.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Chemistry 20 (Qual. Anal.)	3	Accounting 21 (Elements)	3
English 3 (Composition & Lit.)	2	Chemistry 20 (Qual. Anal.)	3
Physics 1 (Gen. Physics)	4	English 5 (Tech. Expo.)	2
Math. 4 A.S. (Dif. Calc.)	3	Physics 1 (Gen. Physics)	4
Draw. 9 (Machine Drawing)	2	Math. 5 (Int. Calc.)	3
Wood Tech. 2 (Dendrology)	3	Speech 14 (Pub. Speak.)	2
	<u>17</u>		<u>17</u>

## SUMMER CAMP

Situated on Cranberry Lake in the Adirondacks. Begins the first week in July and runs for 10 weeks. Prerequisite; Wood Tech. 2.

The purpose of the work is to give such elementary training (1) in dendrology and silviculture as to acquaint the student with the forest and its treatment, (2) to train him in the elements of surveying and of forest measurement and (3) to provide an opportunity for him to study the details of mills using wood as a raw material and converting wood into useful products. For satisfactory completion of the work the following credits are given:

	<i>Credit Hours</i>
Dendrology	$\frac{1}{2}$
Silviculture	1
Surveying (Theory & Pract.)	3
Mensuration (Theory & Pract.)	3
Layout & Operation of Manufacturing Plants	2
Manual Arts	$\frac{1}{2}$
	<u>10</u>

## JUNIOR YEAR

To be taken by students in Technical Properties of Wood.

<i>First Semester</i>	<i>Credit Hours</i>	<i>Second Semester</i>	<i>Credit Hours</i>
Elec. Lab. 5 (Experiments)	1	Elec. Lab. 6 (Experiments)	1
Elec. Mach. 5 (Prin. Elec. Engr.)	3	Elec. Mach. 6 (Principles)	3
For. Botany 3 (Plant Phys.)	3	Mech. Lab. 3 (El. Mech. Lab.)	1
Heat & Power 1 (Steam Engines)	3	Pulp & Paper 11b (Forest Chem.)	3
Pulp & Paper 11a (Forest Chem.)	3	Utilization 2 (Lumber Mfg.)	3
Utilization 1 (Logging)	3	Utilization 4 (Products)	3
Wood Tech. 4a (Wood Ident.)	2	Utilization 5 (W. W. Mach.)	2
	<u>18</u>	Wood Tech. 4b (Wood Ident.)	2
			<u>18</u>

## JUNIOR YEAR

To be taken by students in Conversion and Distribution.

<i>First Semester</i>		<i>Second Semester</i>	
	<i>Credit Hours</i>		<i>Credit Hours</i>
For. Botany 3 (Plant Phys.)	3	Bus. Law 1 (Elements)	2
Economics 1 (General)	3	Economics 1 (General)	3
Heat & Power 1 (Steam Engines)	3	Mech. Lab. 3 (El. Mch. Lab.)	1
Utilization 1 (Logging)	3	Utilization 2 (Lumber Mfg.)	3
Wood Tech. 4a (Wood Ident.)	2	Utilization 4 (Products)	3
Elective	3	Utilization 5 (W. Mach.)	2
	17	Wood Tech. 4b (Wood Ident.)	2
		Elective	3
			19

## JUNIOR YEAR

To be taken by students in Pulp and Paper Manufacture.

<i>First Semester</i>		<i>Second Semester</i>	
	<i>Credit Hours</i>		<i>Credit Hours</i>
Chemistry 130 (Quan. Anal.)	3	Business Law 1 (Elements)	2
Economics 1 (General)	3	Chemistry 130 (Quan. Anal.)	3
Pulp & Paper 1a (Technology)	3	Pulp & Paper 1b (Technology)	3
Pulp & Paper 2a (Tech. Lab.)	2	Pulp & Paper 2b (Tech. Lab.)	2
Pulp & Paper 3a (Machinery)	2	Pulp & Paper 3b (Machinery)	2
Pulp & Paper 4 (Mill Anal.)	2	Pulp & Paper 5b (Pulp Test.)	2
Pulp & Paper 5a (Pulp Test.)	1	Pulp & Paper 6 (Paper Test)	1
Pulp & Paper 11a (For. Chem.)	3	Pulp & Paper 11b (For. Chem.)	3
	19		18

## SENIOR YEAR

To be taken by students in Technical Properties of Wood.

<i>First Semester</i>		<i>Second Semester</i>	
	<i>Credit Hours</i>		<i>Credit Hours</i>
For. Botany 5 (Wood Path.)	2	Bus. Law 1 (Elements)	2
Economics 1 (General)	3	Entomology 4 (Flor. Prod. Ent.)	2
Utilization 6 (Port. Mill.)	1	*Utilization 7 (Field trip)	2
Utilization 14 (Dry Kiln)	3	Utilization 19 (Uses of Wood)	2
Utilization 16 (Reg. Stud.)	3	Wood Tech. 13b (Lab.)	1
Utilization 17 (Preservation)	3	Elective	10
Wood Tech. 13a (Tim. Phys.)	2		19
Elective	2-3		
	19-20		

\* See description of course, page 39.

## SENIOR YEAR

To be taken by students in Conversion and Distribution.

<i>First Semester</i>		<i>Second Semester</i>	
	<i>Credit Hours</i>		<i>Credit Hours</i>
For. Botany 5 (Wood Path.)	2	Entomology 4 (For. Prod. Ent.)	2
Utilization 6 (Port. Mill.)	1	Mfg. & Man. 3 (Ind. Engr.)	2
Utilization 14 (Dry Kiln)	3	Mfg. & Man. 4 (Ind. Invest.)	2
Utilization 16 (Reg. Stud.)	3	*Utilization 7 (Field trip)	2
Utilization 17 (Preservation)	3	Utilization 11 (Salesmanship)	2
Elective	6	Utilization 12 (Bus. Meth.)	3
	18	Utilization 19 (Uses of Wod)	2
		Elective	5
			20

\* See description of course, page 39.

## SENIOR YEAR

To be taken by students in Pulp and Paper Manufacture.

<i>First Semester</i>		<i>Second Semester</i>	
	<i>Credit Hours</i>		<i>Credit Hours</i>
Elec. Lab. 5 (Experiments)	1	Elec. Lab. 6 (Experiments)	1
Elec. Mach. 5 (Prin. Elec. Engr.)	3	Elec. Mach. 6 (Principles)	3
Heat & Power 1 (Steam Engines)	3	Mech. Lab. 3 (El. Mech. Lab.)	1
Pulp & Paper 7 (Coloring)	2	Pulp & Paper 8 (Mill Org.)	1
Pulp & Paper 9 (Problem)	1	Pulp & Paper 10 (Problem)	3
Pulp & Paper 12 (Cellulose Chem.)	3	Pulp & Paper 12 (Cellulose Chem.)	3
Wood Tech. 4a (Wood Ident.)	2	Wood Tech. 4b (Wood Ident.)	2
Elective	3	Wood Tech. 5 (Fibers)	2
	18	Elective	3
			19



## DESCRIPTION OF COURSES

Note.—A numeral following the title of the course indicates the number of credit hours a week. A credit hour means one recitation (or lecture) hour per week. Three laboratory hours are equivalent to one credit hour. The Roman numeral following the description indicates the semester in which the course is given. In case of courses running through the year, the semester is indicated also by small letters following the course number; thus, 1a and 1b indicate that the first and second halves of the course are given in the first and second semester respectively.

### General Forestry

1a and 1b. INTRODUCTION TO FORESTRY. 2 hours credit each semester. One hour of lecture. One hour of recitation. Development of a broad and clear conception of forestry and of the lumber and other forest products industries. Nature, content and interrelation of the different branches of forestry and wood-using industries. The development of forestry throughout the world and its relation to human affairs is stressed. Special consideration is given to the development of forestry and the forest situation in the United States with special reference to forestry in New York State.—I and II. Mr. Illick and assistants.

### Forest Botany

1a and 1b. FOREST BOTANY. 3 hours credit each semester. Two hours of lecture. Three hours of laboratory. Structure and functions of plants and the fundamental problems of Botany, together with a general survey of the plant kingdom.—I and II. Mr. Meier and assistants. Prerequisite to all other courses in Forest Botany.

3. PLANT PHYSIOLOGY. 3 hours credit. Lectures, recitations and laboratory. Fundamental physiological processes involved in growth of plants.—I. Mr. Young and assistants.

4. PLANT TAXONOMY. 2. hours credit. Lectures, recitations, laboratory and field work. Fundamentals of plant classification.—II. Mr. Young and assistants.

5. WOOD PATHOLOGY. 2 hours credit. One hour of lecture. Three hours of laboratory. Effects of fungi on wood and wood products.—I. Mr. Hirt. Prerequisite: Course 3. Course 11 strongly recommended.

11. GENERAL MYCOLOGY. 3 hours credit. One hour of lecture. Four to six hours of laboratory. Structure and life histories of fungi.—II. Mr. Hirt. Prerequisite: Course 3.

12. FOREST PATHOLOGY. 3 hours credit. Two hours of lecture. Three hours of laboratory. Diseases of plants in general, with especial emphasis upon diseases of trees.—I. Mr. Hirt. Prerequisite: Course 3. Course 11 recommended.

13. CULTURE METHODS. 3 hours credit. Six hours of laboratory and conference. Technique in the isolation and pure culture of fungi.—II. Mr. Hirt. Prerequisite: Course 12.



14a and 14b. **ADVANCED MYCOLOGY.** 3 hours credit each semester. The classification of fungi.—I and II. Mr. Hirt. Prerequisite: Course 11.

15. **ADVANCED FOREST PATHOLOGY.** 3 hours credit. One hour of lecture. Six hours of laboratory. Individual studies in minor problems in Forest Pathology.—II. Mr. Hirt. Prerequisite: Courses 11 and 12.

16a and 16b. **ADVANCED PLANT PHYSIOLOGY.** 3 hours credit each semester. Open to seniors and graduates. Fundamental characteristics of living matter and life processes in plants. Hours to be arranged.—I and II. Mr. Meier.

17. **ADVANCED TAXONOMY OF THE FLOWERING PLANTS.** 3 hours credit. Two hours of lecture. One laboratory period. Taxonomy of natural groups closely related to forestry.—II. Mr. Young. Prerequisite: Course 4.

18. **PLANT ANATOMY AND TECHNIQUE.** 3 hours credit. The essentials of plant anatomy other than wood, and the elements of technique required for such study.—I. Mr. Meier.

19. **ADVANCED PLANT ECOLOGY.** 3 hours credit. For seniors and graduates. Ecological factors associated with plant growth and distribution in relation to plant succession; application and interpretation of modern electrometric methods.—I. Mr. Young. Prerequisite: Botany 3 and 4 and after consultation with instructor.

21. **RESEARCH IN FOREST BOTANY AND PATHOLOGY.** For Graduate students.—I and II. Messrs. Meier, Hirt and Young.

## English

3. **COMPOSITION AND LITERATURE.** 2 hours credit. A brief history of English literature, with intensive drill in the broader aspects of informative writing by means of assigned themes and class papers.—I. Mr. Lee.

5. **TECHNICAL EXPOSITION.** 2 hours credit. The use of English as employed by the professional man in the preparation of reports, technical and professional papers, and business correspondence.—II. Mr. Lee.

## Forest Entomology

1. **ELEMENTARY ENTOMOLOGY.** 2 hours credit. Lectures and laboratory. Morphology, life histories and general classification of insects.—II. Mr. Fletcher. Prerequisite: Forest Zoology 1. Prerequisite to all other courses in Forest Entomology.

2. **FOREST ENTOMOLOGY.** 3 hours credit. Two hours of lecture. Three hours of field and laboratory. Injury, biology and control of insects of economic importance in Forestry.—I. Mr. MacAndrews.

3. **SHADE TREE ENTOMOLOGY.** 3 hours credit. Two hours of lecture. Three hours field and laboratory. Important insects attacking shade

trees and ornamental shrubs. Insecticides and their application.—II. Mr. MacAndrews.

4. INSECTS AFFECTING FOREST PRODUCTS. 2 hours credit. Two hours of lecture. Biology, control and a study of injury.—II. Mr. MacAndrews.

11. ELEMENTARY INSECT TAXONOMY. 3 hours credit. One hour of lecture. Six hours of laboratory. Classification, literature and keys.—I. Mr. Fletcher. Prerequisite: Course 2.

12. INSECT ANATOMY. 3 hours credit. Two hours of lecture. Three hours of laboratory. Internal and external anatomy of insects and the functions of the parts.—I. Mr. Fletcher. Prerequisite: Course 2.

13. ADVANCED INSECT TAXONOMY. 3 hours credit. One hour of lecture. Six hours of laboratory. Classification of the important groups of forest insects. Library work and problems in taxonomy.—II. Mr. MacAndrews. Prerequisite: Courses 11 and 12.

14. PROBLEMS IN FOREST ENTOMOLOGY. 3 hours credit. One hour conference. Six hours of field and laboratory. Individual study of small problems in forest entomology.—I or II. Mr. MacAndrews. Prerequisite: Courses 11 and 12.

15. SEMINAR. 3 hours credit. Three hours conference. Library investigations, reports, current research in forest entomology; and phases of entomology not covered in previous courses.—II. Mr. MacAndrews. Prerequisite: Courses 11 and 12.

16. INSECT ECOLOGY. 3 hours credit. Two hours of lecture. Three hours of laboratory. Interacting environmental or habitat factors which influence the relative abundance and distribution of insects and the practical application of ecological principles to problems in forest entomology. Field and Insectary methods of study.—I. Mr. MacAndrews. Prerequisite: Course 2.

20. INSECT HISTOLOGY. 3 hours credit. Nine hours of laboratory. Technique used in the preparation of insect material for microscopic study.—I or II. Mr. Fletcher. Open to graduate students only.

21. RESEARCH PROBLEMS IN FOREST ENTOMOLOGY. For graduate students.—I and II. Staff.

## Landscape Engineering

1a and 1b. ELEMENTS OF LANDSCAPE DESIGN. 4 hours credit each semester. Lectures and elementary drafting practice. Principles and history of Landscape Engineering.—I and II. Messrs. Cox, Arnold and Wagner.

2a and 2b. PLANT MATERIALS. 3 hours credit each semester. Lectures, field trips, and preparation of planting plans. Deciduous and evergreen shrubs, vines and perennials.—I and II. Mr. Arnold.

3a and 3b. LANDSCAPE ENGINEERING DESIGN. 6 hours credit each semester. Lectures and drafting practice in the preparation of original designs in Landscape Engineering.—I and II. Messrs. Cox, Arnold and Wagner. Prerequisite: Course 1.

4a and 4b. LANDSCAPE ENGINEERING CONSTRUCTION. 3 hours credit each semester. Lectures, construction plans and estimates. Road design and pavement construction, grading and drainage details for various types of landscape engineering construction.—I and II. Messrs. Cox and Wagner. Prerequisite: Course 1.

5. CITY PLANNING. 3 hours credit. Two hours of lecture. One hour reports and assigned reading. Economic, esthetic and engineering principles underlying modern city planning.—I. Mr. Arnold.

6. SHADE AND ORNAMENTAL TREES. 3 hours credit. Three hours of lecture. Deciduous and evergreen trees used for ornamental purposes; their identification, pruning, use and care with especial reference to the details of city forestry practice. The subject of tree repair, or "tree surgery" is covered in the course.—II. Mr. Cox. Prerequisite: Course 1.

7a and 7b. CAMP AND PARK STRUCTURES. 3 hours credit each semester. Lectures and drafting. The design and construction of general structures for camps and parks, including walls, seats, steps, pools and fountains, dams, docks, water and sewage systems, and simple buildings.—I and II. Mr. Wagner. Prerequisite: Course 1.

8. PARK ADMINISTRATION AND MAINTENANCE. 3 hours credit. The theory and practice of organization for state, county and municipal park systems, park statistics, park budgets, methods of acquisition of park lands, park legislation, etc.—II. Mr. Cox. Prerequisite: Course 1.

21. RESEARCH PROBLEMS IN LANDSCAPE ENGINEERING. For graduate students.—I and II. Mr. Cox.

22. ADVANCED LANDSCAPE ENGINEERING DESIGN. For graduate students. The major part of the course is devoted to a thesis with investigation and original design.—I and II. Messrs. Cox and Wagner. Prerequisite: Courses 1, 2, 3, 4, 5, and Architecture 2.

23. ADVANCED LANDSCAPE ENGINEERING CONSTRUCTION. Original problems with specifications and estimates.—I and II. Messrs. Cox and Wagner. Prerequisite: Courses 1, 2, 3, 4, 5.

24. ADVANCED CITY PLANNING. Special problems in park and city planning design. For graduate students.—I and II. Mr. Cox. Prerequisite: Courses 1, 2, 3, 4, 5.

## Forest Management

1a and 1b. PLANE SURVEYING. 3 hours credit each semester. Two hours of lecture. Three hours field work. Introduction to the theory and practice of plane surveying. First semester: source and importance of errors, methods of keeping field notes, chaining, reading angles, use of transit and level, methods of running transit lines and locating details. Practice work in the field. Small parties, short exercises, and competent supervision are arranged for field exercises.—I. Mr. Sammi.

Second semester: study of stadia, plane table and topographic mapping, triangulation, calculation of bearings, latitudes and departures, areas, office computations and methods, and significant figures; conventional signs and map plotting; field work with level, traverse board, compass, transit and tape.—II. Mr. Delavan.

2. FOREST MENSURATION. 3 hours credit. One hour of lecture. One hour of recitation. Three hours of laboratory. Principles and practice of log, tree and stand measurements. Log rules and scaling; volume tables and cruising; growth prediction and yield tables. Principles of graphical presentation and elementary statistical measures.—II. Mr. Sammi.

3. MAPPING TECHNIQUE. 1 hour credit. Three hours in drafting room. Methods of expressing data in the form of maps, with special reference to topographic, type, stock, property, recreation, and other widely used forestry maps.—II. Mr. Delavan.

4. FOREST ROADS AND TRAILS. 3 hours credit. One hour of lecture. Six hours of field and laboratory. Engineering principles governing location, design, construction and maintenance of roads, trails, dams, bridges, water supplies, and drainage and sewer systems; particular emphasis on the types of roads and trails being built in forest properties. Examination of county and forest road projects under construction; location and staking out of sample road by various methods; plan and profile for a secondary forest road.—II. Mr. Delavan.

5. FOREST STRUCTURES. 3 hours credit. Location, design and construction of forest structures such as houses, offices, cabins, towers, camps, garages, tool houses, sheds and shelters. Materials and construction methods used on the national and state forests.—II. Mr. Delavan. Not given 1934-35.

6. FOREST REGULATION. 3 hours credit. Three hours of lecture. Organization of forest for management and problems of sustained yield. Normal and empirical forests, rotations, cutting cycles and methods of regulating the cut. Preparation and application of working plans to forest properties.—I. Mr. Belyea.

7. FOREST FINANCE. 3 hours credit. Three hours of lecture and recitation. Business aspects of forest management and principles of



economics and finance underlying the administration and valuation of forest properties. Stumpage and land appraisal, damage assessment, relation of capital and income, and problems of financial rotations, forest fire insurance and forest taxation.—II. Mr. Belyea. Not given 1934-35.

10. FOREST ECONOMICS. 3 hours credit. Three hours of lecture. The forest in our economic life and its place in the productive utilization of land. Economics of forest distribution, exploitation, ownership, lumber production and lumber consumption in the United States. Problem of price trends as affecting wood uses, and the effect of wood substitutes. Future economic trends, position of the United States as a factor in the world's timber supply, and economics of watershed protection, forest recreation, range management, and wild life conservation.—II. Not given 1934-35.

11. ADVANCED FOREST MENSURATION. 2 hours credit. Six hours of laboratory. Application of statistical methods to problems in forest mensuration. Alignment chart construction, application and limitations; anamorphic curves. Determination and application of growth to wild and unmanaged, all-aged and even-aged stands. Construction and application of yield tables.—I. Mr. Belyea.

12. FOREST ADMINISTRATION AND POLICY. 3 hours credit. Three hours of lecture and recitation. Administrative and executive aspects of forestry. Important activities of forest officers, major problems of administration, and recommendable principles for handling forest properties. The work and organization of the United States Forest Service, other federal agencies engaged in forestry, and state forest services. Forest administration by counties, municipalities, industrial organizations, private owners and in foreign countries. Personnel management, job analyses, planning executive work, organizing forest activities, fiscal problems, legal procedures, development of federal and state forest policies and legislation, and status of private forestry.—I. Mr. Illick.

13. FOREST ACCOUNTS AND RECORDS. 3 hours credit. Three hours of lecture and recitation. For students who wish to prepare for the responsibility of administering forests. Accounting systems of the U. S. Forest Service, state forest services and private forest enterprises.—II. Prerequisite: Accounting 21. Not given 1934-35.

14. FOREST MANAGEMENT SEMINAR. 2 hours credit. Two hours of discussion, conference and reports. Current literature, plans and principles, and new developments in the general field of forest management.—II. Messrs. Illick, Delavan, and Belyea.

20. APPLIED FOREST MANAGEMENT. 3 hours credit. For graduate students. Application of the principles of forest management to specific forest properties under the direct guidance of state foresters, national forest supervisors, district foresters, county foresters, city foresters and

other local forest officers. Study trips to national, state, county, municipal, corporate and private forests. From 12 to 15 full days, including from 2,000 to 2,500 miles of travel, are spent in the field studying forest conditions, organizations, operations, and problems. Through actual forest demonstrations, the student is acquainted with the latest forest practices in the office and the forest.—I. Mr. Illick.

21. **FOREST MANAGEMENT PROBLEMS.** For graduate students. Special study of assigned problems. Hours to be arranged.—I and II. Messrs Illick, Delavan, and Belyea.

## **Pulp and Paper Manufacture**

Special circular describing the work of the pulp and paper course may be obtained from the Registrar of the College.

1a and 1b. **TECHNOLOGY.** 3 hours credit each semester. Three hours of lecture. Processes employed in the manufacture of pulp and paper.—I and II. Mr. Libby. Prerequisite or parallel courses: Chemistry 20 and 130.

2a and 2b. **TECHNOLOGY LABORATORY.** 2 hours credit each semester. Six hours of laboratory. Demonstrations of the principles of pulp and paper manufacture described in Course 1.—I and II. Mr. Morgan. Prerequisite or parallel courses: Pulp and Paper 1 and 3.

3a and 3b. **MACHINERY.** 2 hours credit each semester. Two hours of lecture. Design, construction and operation of machinery used in the pulp and paper industry.—I and II. Mr. Morgan. Prerequisite or parallel courses: Physics 1 and Pulp and Paper 1.

4. **MILL ANALYSIS.** 2 hours credit. Six hours of laboratory. Evaluation of materials used in the manufacture of pulp and paper.—I. Mr. Morgan. Prerequisite or parallel courses: Chemistry 20 and 130 and Pulp and Paper 1.

5a and 5b. **PULP TESTING.** 1 hour credit each semester. Three hours of laboratory. Physical and chemical properties of pulp. Oil and coal analysis.—I and II. Mr. Peterson. Prerequisite or parallel course: Pulp and Paper 4.

6. **PAPER TESTING.** 2 hours credit. Six hours of laboratory. Physical, chemical and microscopical characteristics of papers.—II. Mr. Libby. Prerequisite or parallel course: Pulp and Paper 4.

7. **COLORING.** 2 hours credit. Six hours of laboratory. Evaluation and identification of dyestuffs and the development of color formulas for dyeing pulp and paper.—I. Mr. Libby. Prerequisite or parallel course: Pulp and Paper 4.

8. **MILL ORGANIZATION.** 1 hour credit. Lectures and seminar. Organization and methods of administration of typical industrial enterprises with particular emphasis on the features of organization peculiar to the pulp and paper industry.—II. Mr. Libby.



9. PROBLEM. I hour credit. A report covering a systematic survey of all available literature on some problem of interest to the pulp and paper industry.—I. Messrs. Libby, Peterson, and Morgan. Prerequisite or parallel courses: Pulp and Paper 1 to 7; 11, 12 and 13. Chem. 20 and 130.

10. PROBLEM. 3 hours credit. Laboratory development of the problem formulated in course 9.—II. Messrs. Libby, Peterson and Morgan. Prerequisite: Pulp and Paper 9.

11a and 11b. FOREST CHEMISTRY. 3 hours credit each semester. Two hours of lecture. Three hours of laboratory. Elementary organic chemistry.—I and II. Mr. Peterson. Prerequisite: Chemistry 1 and 20.

12. CHEMISTRY OF CELLULOSE. 3 hours credit. Three hours of lecture. Constitution, properties and uses of cellulose and its derivatives. Chemistry of associated polysaccharides.—I. Mr. Peterson. Prerequisite: Pulp and Paper 11.

13. CHEMISTRY OF CELLULOSE AND LIGNIN. 3 hours credit. Two hours of lecture. Three hours of laboratory. Review of recent cellulose literature. Chemistry of lignin. Laboratory isolation and study of cellulose and lignin.—II. Mr. Peterson. Prerequisite: Chemistry 1, 20 and 130; Pulp and Paper 11 and 12.

14. ANALYSIS OF WOOD. 3 hours credit. Nine hours of laboratory. Quantitative proximate analysis of sound or decayed woods.—II. Mr. Peterson. Prerequisite: Chemistry 1, 20 and 130; Paper and Pulp 11, 12 and 13.

21. RESEARCH IN PULP AND PAPER MANUFACTURE OR IN FOREST CHEMISTRY. Graduate elective. Hours to be arranged. Problems in pulp and paper manufacture and in forest chemistry and organic chemistry will be assigned to properly qualified graduate students.—I and II. Messrs. Libby, Peterson and Morgan. Prerequisites depend upon the nature of the problem.

## Forest Recreation

1a and 1b. RECREATIONAL USES OF LAND AREAS. 3 hours credit each semester. Lectures, field trips and assignments. Economic and social uses of land areas for recreational purposes.—I and II. Messrs. Welch and Francis.

2a and 2b. CAMPING TECHNIQUE. 3 hours credit each semester. Lectures, field trips and laboratory exercises. The details of camping technique, such as clothing and equipment, tents and supplies, canoeing, portaging, packing, fires, cooking, etc.—I and II. Messrs. Welch and Arnold.

3. CAMP ADMINISTRATION AND MAINTENANCE. 3 hours credit. Lectures, field trips and reports on the operation and management of organized camps. Statistics, budgets, camp location, health standards, camp diet, food supplies, etc.—I. Mr. Welch.

4. NATIONAL PARK PRACTICE. 3 hours credit. Two hours of lecture with reports. Laws, practices and policies governing the use and operation of the National Parks.—II. Mr. Francis.

5. EUROPEAN PRACTICE IN RECREATIONAL USES OF FORESTS. 3 hours credit. Three hours of lecture. Practices in Germany, France and Switzerland.—I. Mr. Francis.

6. PROGRAM BUILDING FOR RECREATIONAL GROUPS. 3 hours credit. Theory and practice of program building for juvenile and adult groups. Case studies of camp and park programs with critical analyses.—I. Mr. Welch.

7. NATURE LORE METHODS. 3 hours credit. Two hours of lecture. Three hours of laboratory or field work. Methods, such as constructing nature trails and trailside museums, conducting field trips, directing games, story telling, giving formal lectures, and others designed to arouse and hold the interest of children or adults in the natural sciences.—I. Mr. Welch.

21. RESEARCH PROBLEMS IN FOREST RECREATION. Hours to be arranged.—I. and II. Mr. Cox.

22. PROJECTS IN FOREST RECREATION. 3 hours credit. One hour of lecture. Six hours of laboratory. Common problems in forest recreation and their logical solution.—I. Mr. Francis. Prerequisite: Forest Recreation 1.

## Silviculture

1. FOUNDATIONS OF SILVICULTURE. 3 hours credit. Two hours of lecture. Three hours field work. Site factors and their effect on forest vegetation. Relation of the forest to the site. The forest as a community.—I. Mr. McCarthy.

3. SEEDING AND PLANTING. 3 hours credit. Two hours of lecture. Three hours of laboratory. All phases of forest propagation, especially by seeding and planting.—II. Mr. Prichard.

4. PRACTICE OF SILVICULTURE. 4 hours credit. Two hours of lecture. Field work given during May at Pack Demonstration Forest, Warrensburg, N. Y. Reproduction cuttings, intermediate cuttings and cultural operations, as used in this country and abroad.—II. Mr. Heiberg.

6. SILVICULTURE. 3 hours credit. To be taken by students in Landscape and Recreational Management. Not given 1934-35.

11. FOREST PROTECTION. 3 hours credit. Lectures and field work in the protection of forests from fire, wind, frost, animals, and other destructive agencies.—I. Mr. Prichard.

12. SILVICULTURE SEMINAR. 2 hours credit. Two hours conference and discussion of silvicultural problems. Thorough review of the literature on silviculture.—I. Mr. McCarthy. Beginning with academic year 1935-36, this course will be given during second semester.

13. **EXPERIMENT STATION PROBLEMS.** 3 hours credit. Organization, supervision, opportunities, training, methods and results of silvicultural research. Undertakes to equip the student for carrying on research work in silviculture.—II. Mr. McCarthy. Given last time, spring 1935.

14. **REGIONAL STUDIES.** 2 hours credit. Silvicultural methods as applied in the management of the important species in the different forest regions of North America,—I. Mr. Heiberg.

15. **FOREST SOILS.** 2 hours credit. Field trips, lectures and laboratory work. Field identification of forest soils; the effect on the soil of silvicultural operations; the selection of species for planting on different soils, and methods of sampling and laboratory analysis.—I. Mr. Heiberg. Prerequisite: Soils 1.

16. **FORESTRY TRIP.** 2 hours credit. Three to four weeks tour to national, state and private forest operations, mainly in the southern states. Starts immediately following Christmas vacation and extends until beginning of second semester.—I. Mr. Heiberg. Not given 1934-35.

21. **SILVICULTURE RESEARCH.** For graduate students. Hours to be arranged.—I and II. Messrs. McCarthy, Prichard and Heiberg.

## Wood Technology

1a and 1b. **DENDROLOGY.** 3 hours credit each semester. Two hours of recitation or lecture. Three hours of laboratory. Taxonomy and elementary silvics of woody plants, with special reference to the genera and species native to the Northeastern and other important forest regions of the United States.—I and II. Mr. Harlow.

2. **DENDROLOGY.** 3 hours credit. Two hours of recitation or lecture. Three hours of laboratory. Taxonomy and elementary silvics of the most important genera and timber species of the United States.—I. Mr. Harlow.

3. **WOOD TECHNOLOGY.** 3 hours credit. One hour of lecture. Six hours of laboratory. Structural features of wood. Identification of woods by gross structure. The physical properties of wood of value in identification.—I. Mr. Brown. Prerequisite: Wood Technology 1.

4a and 4b. **WOOD TECHNOLOGY.** 2 hours credit each semester. In first semester, one hour of lecture and three hours of laboratory; in second semester, six hours of laboratory. Structural features of wood. Identification of woods by gross and minute structure. The physical properties of wood of value in identification.—I. and II. Mr. Brown. Prerequisite: Wood Technology 2.

5. **PAPER-MAKING FIBRES.** 2 hours credit. Six hours of laboratory. A morphological and taxonomic study of the fibres used in papermaking.—II. Mr. Forsaith. Prerequisite: Wood Technology 1 or 2, and 3 or 4.

6. **HIGHLIGHTS OF SCIENCE.** 1 hour credit. One hour of lecture; outside reading. A chronological study of the main events in the develop-

ment of the various branches of science, and of the outstanding contributors in the different fields from early to modern times.—I. Mr. Forsaith.

11. **ADVANCED HISTORICAL MORPHOLOGY.** 3 hours credit. Two hours of lecture. Three hours of laboratory. Evolution of prehistoric and modern woody plants, based on the gross and minute anatomy of their tissues.—I or II. Mr. Forsaith. Prerequisite: Wood Technology 1 or 2, and 3 or 4.

12. **MICROTECHNIQUE OF THE TISSUE OF WOODY PLANTS.** 3 hours credit. One hour of lecture. Six hours of laboratory. Preparation of the tissues of woody plants for sectioning. Technique of sectioning, staining and mounting. Theory and elementary chemistry of staining.—II. Mr. Harlow. Prerequisite: Wood Technology 1 or 2, and 3 or 4; Pulp and Paper 11, except by special arrangement.

13a and 13b. **TIMBER PHYSICS.** First semester, 2 hours credit; lecture. Second semester, 1 hour credit; 3 hours of laboratory. Physical and mechanical properties of wood, including descriptive lectures, recitations; practical strength tests.—I and II. Mr. Forsaith. Prerequisite: Wood Technology 1 and 2, and 3 or 4; Physics 1.

14a and 14b. **COMMERICAL TIMBERS OF THE WORLD.** 3 hours credit each semester. One hour of lecture. Six hours of laboratory and assigned reading. Important commercial timbers of the world from the standpoint of structure, physical properties, identification, available supply, and uses.—I and II. Mr. Brown. Prerequisite: Wood Technology 1 or 2, and 3 or 4.

21. **RESEARCH IN DENDROLOGY AND WOOD TECHNOLOGY.** For graduate students. Hours to be arranged.—I and II. Messrs. Brown, Forsaith and Harlow.

## Forest Utilization

1. **LOGGING.** 3 hours credit. Three hours of lecture. History, economics and development of the lumber industry and its relation to forestry. Detailed studies of logging and log transportation.—I. Mr. Brown.

2. **LUMBER MANUFACTURE.** 3 hours credit. Three hours of lecture. Methods and problems of manufacturing lumber.—II. Mr. Brown.

3. **GLUES AND FINISHES.** 2 hours credit. Two hours of lecture. Properties, uses, and application of the glues and finishes used in the woodworking industries.—I. Mr. Blew.

4. **FOREST PRODUCTS.** 3 hours credit. Three hours of lecture. Minor forest products such as cross ties, veneer, paper pulp, cooperage, naval stores, wood distillates, etc.—II. Mr. Blew.

5. **WOODWORKING MACHINERY.** 2 hours credit. Lectures, shop practice, and plant studies in the care, use, production, power and waste in woodworking machinery.—II. Mr. Henderson.



6. PORTABLE MILLING AND WOODLOT LOGGING. I hour credit. One hour of lecture; three hours of laboratory for eight weeks. Principles and practice of portable mill work and intensive logging and utilization.—I. Mr. Henderson.

7. FIELD UTILIZATION STUDY. 2 hours credit. Three weeks field trip during Senior year to make detailed analysis of logging, milling and wood utilization.—II. Mr. Brown.

11. LUMBER SALESMANSHIP. 2 hours credit. Two hours of lecture. Principles underlying salesmanship with particular reference to lumber, and their application in the American lumber industry. II. Mr. Hoyle.

12. BUSINESS METHODS IN THE LUMBER INDUSTRY. 3 hours credit. Three hours of lecture. Problems affecting the grading, transportation and merchandising of lumber; organization and methods pursued by distributing agencies.—II. Mr. Brown.

13. AMERICAN LUMBER EXPORT TRADE. 2 hours credit. Two hours of lecture. Export methods, ocean shipping, foreign finance and the present and prospective markets for American lumber.—I or II. Mr. Brown.

14. DRY KILN ENGINEERING. 3 hours credit. Two hours of lecture. Three hours of laboratory. Theoretical and practical application of kiln drying of wood products.—I. Mr. Henderson.

15. ADVANCED DRY KILN ENGINEERING. 3 hours credit. Conferences and laboratory work. Dry kiln problems of the woodworking industries.—II. Mr. Henderson.

16. REGIONAL STUDIES. 3 hours credit. Three hours of lecture. Economic conditions and problems of distribution of the lumber and other wood industries in the principal timber regions of the United States.—I. Mr. Hoyle.

17. WOOD PRESERVATION. 3 hours credit. Two hours of lecture and laboratory. Wood preservatives and methods of treatment.—I. Mr. Blew.

18. ADVANCED WOOD PRESERVATION. 3 hours credit. Lectures and laboratory. The wood preserving industry. Construction and operation of wood preserving plants. Management and costs. Uses of treated wood.—II. Mr. Blew. Prerequisite: Utilization 17.

19. USES OF WOOD. 2 hours credit. Two hours of lecture. Commercial properties, adaptability, supply and utility of the principal American and foreign species manufactured into lumber.—II. Mr. Hoyle.

21. UTILIZATION PROBLEMS. For graduate students. Conferences and library and laboratory research in the lumber and associated industries. Hours to be arranged.—I and II. Messrs. Brown, Henderson, Hoyle and Blew.

## Forest Zoology

1. GENERAL ZOOLOGY. 2 hours credit. One hour of lecture. Three hours of laboratory. General principles of zoology.—I. Messrs. Johnson and Stegeman.

2. FRESH-WATER FISHES. 2 hours credit. One hour of lecture. Three hours of laboratory. Identification, general biology and economics of inland fishes, including the principles of administration and management of fish resources.—I. Messrs. Johnson and Stegeman.

3. ECOLOGY OF FRESH-WATER ANIMALS. 3 hours credit. Two hours of lecture. Three hours of laboratory. Important groups of fresh-water animals and their ecological relations. Principles of aquiculture and a study of the chief fresh-water fisheries and fishery products.—II. Mr. Mueller. Prerequisite: Zoology 1 and 2.

4a and 4b. INVERTEBRATE ZOOLOGY. 3 hours credit each semester. Two hours of lecture. Three hours of laboratory. Structure, classification and evolution of the invertebrates. A fundamental course prerequisite to any further study of problems relating to the invertebrates of the forest community.—I and II. Mr. Mueller. Prerequisite: Zoology 1 and 2.

5. PARASITES OF FISH AND GAME. 3 hours credit. Two hours of lecture. Three hours of laboratory. Parasites and their relation to the diseases of fish and game; brief survey of classes of parasites from the protozoans to the arthropods.—I. Mr. Mueller. Prerequisite: Zool. 1.

7. GAME MAMMALS. 2 hours credit. 1 hour of lecture. Three hours of laboratory. Large and small game mammals of North America; fur-bearers; predatory species, and others that have important ecologic or economic relations; identification and habits. Principles and theories underlying administration and management.—II. Messrs. Johnson and Stegeman.

8. GAME BIRDS. 2 hours credit. One hour of lecture. Three hours of laboratory. Identification, general biology and ecology of the game birds of North America, native and introduced, with consideration also of enemy species. Principles and theories of administration and management.—II. Messrs. Johnson and Stegeman.

11. PROBLEMS IN FOREST ZOOLOGY. Elective. Hours to be arranged. Individual study, by qualified students, of special problems in forest zoology. Prerequisite: Nine hours of forest zoology, and such additional courses as the instructor in charge may deem necessary.—I or II. Messrs. Johnson and Mueller.

21. RESEARCH IN FOREST ZOOLOGY. For graduate students only.—I and II. Messrs. Johnson and Mueller.



### Accessory Courses

The courses listed below are required of students registered in the College of Forestry, but are given in other colleges of the University.

**ACCOUNTING 21.** Elements of Accounting. 3 hours credit. Given in the College of Business Administration. I.

**ARCHITECTURE 2.** Elements of Architecture. 2 hours credit. Given in the College of Fine Arts. I and II.

**BOTANY 25.** Plant Genetics. 3 hours credit. Given in the College of Liberal Arts. II.

**BUSINESS LAW 1.** Elements of Business Law. 2 hours credit. Given in the College of Business Administration. I or II.

**CHEMISTRY 1.** General Chemistry. 4 hours credit. Given in the College of Liberal Arts. I and II.

**CHEMISTRY 20.** Qualitative Analysis. 3 hours credit. Given in the College of Liberal Arts. I and II.

**CHEMISTRY 130.** Quantitative Analysis. 3 hours credit. Given in the College of Liberal Arts. I and II.

**DRAWING 1.** Lettering and Sketching. 1 hour credit. Given in the College of Applied Science. I.

**DRAWING 7.** Mechanical Drawing. 2 hours credit. Given in the College of Applied Science. II.

**DRAWING 9.** Machine Drawing. 2 hours credit. Given in the College of Applied Science. I.

**ECONOMICS 1.** Elements. 3 hours credit. Given in the College of Liberal Arts. I and II, or I.

**ELECTRICAL LABORATORY 5.** Experiments. 1 hour credit. Given in the College of Applied Science. I.

**ELECTRICAL LABORATORY 6.** Experiments. 1 hour credit. Given in the College of Applied Science. II.

**ELECTRICAL MACHINERY 5.** Principles of Electrical Engineering. 3 hours credit. Given in the College of Applied Science. I.

**ELECTRICAL MACHINERY 6.** Principles of Electrical Engineering. 3 hours credit. Given in the College of Applied Science. II.

**ENGLISH 1.** Freshman English. 3 hours credit. Given in the College of Liberal Arts. I and II.

**GEOLOGY 36.** General Geology. 3 hours credit. Given in the College of Liberal Arts. I.

**HEAT AND POWER 1.** Steam Engines. 3 hours credit. Given in the College of Applied Science. I.

**MANUFACTURING AND MANAGEMENT 3.** Industrial Engineering. 2 hours credit. Given in the College of Applied Science. II.

**MANUFACTURING AND MANAGEMENT 4.** Industrial Investigations. 2 hours credit. Given in the College of Applied Science. II.

**MATHEMATICS 4 L.A.** Unified Mathematics. 3 hours credit. Elements of College Algebra, Trigonometry and Analytic Geometry. Given in the College of Liberal Arts. I.

**MATHEMATICS 4 A.S.** Differential Calculus. 3 hours credit. Given in the College of Applied Science. I.

**MATHEMATICS 5.** Integral Calculus. 3 hours credit. Given in the College of Applied Science. II.

**MECHANICAL LABORATORY 3.** Elements of Mechanical Laboratory. 1 hour credit. Given in the College of Applied Science. II.

**PENCIL TECHNIQUE.** 1 hour credit. Given in the College of Fine Arts. I and II.

**PHYSICAL EDUCATION 9.** Methods of Teaching Physical Education Activities. 3 hours credit. Given in the Teachers College. I and II.

**PHYSICS 1.** General Physics. 4 hours credit. Given in the College of Liberal Arts. I and II.

**PHYSICS 5.** Topics of Physics. 3 hours credit. Given in the College of Liberal Arts. I and II.

**SOILS 1.** Soils. 3 hours credit. Given in the College of Liberal Arts. II.

**SPEECH 14.** Public Speaking. 2 hours credit. Given in the School of Public Speech and Dramatic Art. I or II.

# DEDICATION

of the

# Louis Marshall Memorial

February 23, 1933



MAIN BUILDING

LOUIS MARSHALL MEMORIAL

The New York State College of Forestry  
Syracuse University

## — PROGRAM —

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9:30 A. M.

Registration, ground floor, Louis Marshall Memorial Building.

10.30 A. M.

*Auditorium*

Dr. Hugh P. Baker, President of Massachusetts State College, presiding.  
"The Relation of Fundamental Science to Forestry", Dr. Henry Schmitz,  
College of Forestry and Agriculture, University of Minnesota.

"Forestry As An Agency of Social Progress", L. F. Kneipp, Assistant  
Forester, in charge of lands, United States Forest Service, Washing-  
ton, D. C.

"Systematic Botany and Forestry", Dr. E. A. Merrill, Director of the  
New York Botanical Garden.

12:30—1:30 P. M.

Buffet Luncheon for invited guests in museum room.

2:00 P. M.

*Auditorium*

Dean Samuel N. Spring, New York State College of Forestry, presiding.  
Invocation by Dean William H. Powers, Hendricks Chapel, Syracuse  
University.

"History of Forestry Education in New York State" and presentation of  
Marshall Memorial by Dr. Harlan H. Horner, Assistant Commis-  
sioner for Higher Education, New York State Education  
Department.

"A Milestone", and acceptance for the College of Forestry by Justice  
Edmund H. Lewis of the Board of Trustees.

Remarks by James Marshall, representing the Marshall family

"The University", and acceptance for the University by Chancellor  
Charles W. Flint, Syracuse University.

4:00—5:00 P. M.

Inspection of the building.

6:30 P. M.

*Syracuse Hotel*

Annual Forestry Club Banquet, main ballroom.

Dinner for visiting ladies, private dining room.

- 1911—The New York State College of Forestry authorized by the Legislature and Governor John A. Dix. First classes under Dr. William L. Bray, basement of Lyman Hall. Louis Marshall elected President of Board of Trustees at first meeting. Syracuse Experiment Station of 90 acres acquired.
- 1912—Dr. Hugh P. Baker appointed Dean. New York State Ranger School established at Cranberry Lake under College administration. 1800 acres donated to the College for Ranger School by the Rich Brothers Lumber Co.
- 1913—Appropriation for main College building signed by Governor William Sulzer. First summer camp in Catskills under Professor Franklin Moon. 1100 acres of forest land acquired by College near Salamanca.
- 1915—Summer camp transferred to Cranberry Lake under Professor J. Fred Baker.
- 1917—Main College building opened.
- 1920—Dean Baker resigned. Professor Moon appointed Dean.
- 1923—Appropriation for new State Ranger School building signed by Governor Alfred E. Smith. Site of summer camp at Cranberry Lake, 1000 acres, donated by Charles Lathrop Pack.
- 1927—Pack Demonstration Forest, 2200 acres, Warrensburg, N. Y., presented to the University for the College by Mr. Pack.
- 1928—New Ranger School building dedicated.
- 1929—Dean Franklin Moon died. Professor Nelson C. Brown appointed Acting Dean. Louis Marshall, President of the Board of Trustees, died. Former Governor Alfred E. Smith elected President of the Board. 500 acres added to Ranger School forest by gift of International Paper Company.
- 1930—Appropriation for Louis Marshall Memorial building signed by Governor Franklin D. Roosevelt. Dr. Hugh P. Baker reappointed Dean.
- 1931—Corner stone of Louis Marshall Memorial laid by former Governor Alfred E. Smith, assisted by Dr. Frank P. Graves, Commissioner of Education for New York State, Chancellor Charles W. Flint, Syracuse University and Dean Baker.
- 1932—Huntington Forest Experiment Station near Newcomb, N. Y., 13,000 acres, given to University for use of College by Archer and Anna Huntington. Office of Assistant Dean created and filled by Samuel N. Spring.
- 1933—Dean Baker resigned. Assistant Dean Spring appointed Dean. Clyde Leavitt Acting Assistant Dean. Dedication of Louis Marshall Memorial.

## LOOKING FROM BALCONY OF AUDITORIUM



SPEAKERS AND EDUCATORS ON THE STAGE AS DEDICATION CEREMONY WAS ABOUT TO BEGIN



# THE RELATIONSHIP OF THE PHYSICAL AND BIOLOGICAL SCIENCES TO FOREST EDUCATION

By Henry Schmitz,  
Chief of Division of Forestry, University of Minnesota

*Introduced By Dr. Hugh P. Baker, President, Massachusetts State  
College, presiding.*

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TO participate in the dedication of this beautiful building, named in honor of the late Louis Marshall, is indeed a privilege. This is a happy occasion for forestry everywhere, and especially for forest education, because it not only marks the enlargement of the educational facilities of a great forest school but fittingly perpetuates the name of a man who has made a most significant contribution to forest education in the United States.

It is a pleasure and a privilege to bring to you, Mr. Chancellor, Dean Spring, and the Members of the Board of Trustees of the New York State College of Forestry, the cordial greetings and congratulations of the University of Minnesota, and to express to you the high regard in which the New York State College of Forestry is held by the faculty of the Minnesota Forest School.

## Social Factors In Forestry Important

I have been asked to address you this morning on the relationship of the physical and biological sciences to forest education. May I first make it clear that my discussion does not deal with the social sciences in forest education, not because the social sciences do not have an important bearing on forest education, but because this phase of the subject falls beyond the scope of the topic assigned me. May I remark in passing that although it is quite obvious that the practice of forestry has broad social and economic implications, these subjects have been comparatively neglected in our forest school curricula. I venture to predict that just as agriculture in recent years has found the social and economic problems of paramount importance, so we in forestry will some day face a similar situation.

Nevertheless, the physical and biological sciences are basic and of first importance to forest education. This relationship may seem so obvious that discussion would be unfruitful. With such a view I am not in accord. There are many important relationships of the sciences to forest education which escape a casual consideration of this question. They affect profoundly the whole future of forestry and a keener appreciation of these relationships are essential in shaping our educational future.

## Changes To Come In Forestry Education

During the past thirty-two years, forestry education in America has undergone many changes. During the next thirty years forest education will undergo even more far-reaching changes. Educational processes and procedures are receiving more critical study today than ever before. The depression, and its concomitant economic adjustments is stimulating a soul-searching analysis of our whole educational system. A complete overhauling of our entire educational program may result. Whole educational patterns will be altered or discarded and new ones will be developed. The quantity and quality of college work for certain vocations, occupations and professions will be revised and essentials and non-essentials will be reevaluated.

Our social and economic complex is changing with extreme rapidity. The luxury of today becomes the necessity of tomorrow. New industries develop and old industries disintegrate as a result of changes in individual and social customs and needs. In the space of a few years lumber production falls from about 35 billion feet board measure to about 12 billion feet; cotton gives way to rayon; synthetic methanol eliminates the wood distilling industry; motor transportation harasses the railroads; and air transportation in turn competes with motor transportation.

Within the past twenty-five years four great industries, the automobile, the motion picture, the radio and the chemical industries have grown from experimental stages to the production of means of livelihood for 35 millions of our population. Surely our educational procedures must inevitably change to keep pace with these continuous, rapid and far-reaching changes in industry and economics.

## Former Objectives More Clearly Seen

Thirty-five years ago, when professional training in forestry was first undertaken by an American university, educational objectives were quite clearly defined. An era of magnificent development of the Middle Western and Far Western sections of the United States was drawing to a close. The Federal Government had given away, or had been separated from most of the valuable timber land. Some years before, it had become increasingly apparent that unless the Federal Government were to dissipate the last vestiges of its great forest resources something would have to be done to reserve what remained in public ownership.

As a result of this growing sentiment, the Organic Act of 1891 was passed by the Congress, conferring upon the President the power to set apart portions of the unreserved public domain as forest reserves. Before 1897 Presidents Harrison and Cleveland had made use of the power given them by this Act to the extent of setting aside approximately 40,000,000 acres of public domain as forest reserves. By 1901 President McKinley had added 7,000,000 acres to those reserves.

Forest education then was launched in America at an auspicious time. Soon thereafter, the forest reserve policy received added impetus and vigor when President Roosevelt, advised by Gifford Pinchot, set aside as forest reserves 148,000,000 acres of public domain.

The demand for men to administer these newly created reserves was urgent and the work of these men was clearly defined. Above all, it was necessary to protect the newly created reserves from fire. Roads and trails had to be built, telephone lines constructed, ranger cabins erected, timber stands estimated, alienated lands surveyed and the reservations themselves mapped. These were all specific and comparatively simple tasks, and the early forest schools at least had the advantage of following well blazed trails insofar as educational and professional objectives were concerned.

### **Men Well Prepared For Their Task**

That they prepared men adequately to cope with the immediate problems of the day is best indicated by the conspicuous success of the early forest school graduates in overcoming the then existing prejudices against them, by their winning the confidence of the lumbermen, sheepmen and other classes with vested interests in the reserves, and by the rapidity with which these wild areas were brought under simple but effective administration.

It matters little whether or not all of the courses then included in forest school curricula would meet the accepted educational requirements of today. The fact remains that there was an immediate task to do and without many precedents to follow and without much assistance from the older, better established units of the university, the faculties of the newly organized forest schools went to work and accomplished much in a comparatively short space of time.

As I look back some twenty-four years when I was a student, I well recall how much time was devoted to educational procedures which today would be considered vocational even by liberal educators. Despite the fact that I, as most of my classmates, was a western boy and had considerable experience in camping, I was taught how to camp out, how to pack a horse, how to dig a fire trench, how to string a telephone line, the relative merits of beans and rice for human food, and scores of other things not included in forest school curricula today.

I raise this point not in criticism, but rather in commendation of forest education of some twenty-five years ago. Certainly it was not lacking in objectivity and as a matter of fact, these tasks were to the forester of that day as significant and important and easily justified in a college course as many of the more practical procedures still included in engineering, medical, journalism and legal curricula.

### **New Vision Comes With Changed World**

But during the past twenty-five years the activities and duties of foresters have become greatly diversified. Great opportunities for individual advancement and for social service appear in new directions. New vistas have opened in a rapidly changing world. The forest schools must recast and redefine their educational processes in the light of present day and probable future needs. In redefining and recasting these objectives more adequate and more comprehensive training in the physical and biological sciences and in the scientific method will be demanded.

As I see the problem, there are at least three more or less distinct reasons why forest education must more definitely be based upon and fortified by the physical and biological sciences:

1. Greater emphasis must be placed upon the scientific foundations upon which forestry is based, not merely that forest educators may maintain the respect and the confidence of their colleagues in other scientific disciplines, but also because those scientific foundations are fundamental to a solution of forestry problems. Forest science is largely built upon the physical and biological sciences.

2. Training in the sciences and in the scientific method is essential to the proper educational development of the individual student in order to prepare him to solve the complex problems of his profession.

3. Forestry itself is in a sense a melting pot of the biological and physical sciences. Training in forestry, unless based firmly on these sciences, results merely in a trade vocation. The practice of forestry is a profession, not a trade.

### **High Professional Standard Necessary**

With one exception, all American forest schools are units of a college or a university. The intellectual standards and objectives of these colleges and these universities vary greatly. The comparative levels in educational standards in the forest schools and in the college or university is also subject to considerable individual variation. It is our job as forest educators to make sure that the intellectual and educational standards of our curricula are at least equal to the standards maintained in other professions. Whether or not this goal has been reached in all of our forest schools will be judged largely not only by the scientific publications, but by the scholarly attainments of our forestry faculties.

The fact that forest education has practical objectives is no excuse for low standards of scholarship among forest school faculties. I know, of course, that there are men in almost every college or university who think that practical and utilitarian subjects have no place in higher education. There is no reason, however, why the opinions of educational snobs should be taken seriously.

"Knowledge," says Alexander Meiklejohn, "is to be sought chiefly for sake of its contribution to the other activities of human life. But on the other hand, it is as definitely declared that in method the college is fully and unreservedly intellectual. If we can see that these two demands are not in conflict, but that they stand together in the harmonious relation of means and ends, of instrument and achievement, of method and result, we may escape many needless conflicts and keep our educational policy in singleness of aim and action.

"To do this we must show that the college is intellectual, not as opposed to practical interests and purposes, but as opposed to unpractical and unwise methods of work. The issue is not between practical and intellectual aims, but between the immediate and the remote aim, between the hasty and the measured procedure, between the demands for results at once and the willingness to wait for the best results. The intellectual road to success is longer and more round-about than any



other, but they who are strong and willing for the climbing are brought to higher levels of achievement than they could possibly have attained had they gone straight forward in the pathway of quick returns."

### **We Must Meet High Scholarly Standards**

The forest schools are in no sense compromised because of their practical objectives. Rather is their work ennobled and dignified because it contributes materially to human living. Tempered, well informed criticism of forest education would not call to task our objectives, but rather our methods and our procedures.

Intellectual achievement is a real and vital criterion among true scholars. Certainly forestry educators must meet the same scholarly standards as their colleagues in other fields of higher education.

It is not enough merely to include in our various forestry curricula additional courses in the sciences. We, ourselves, must be prepared to meet the fundamental problems of forestry with a fundamental knowledge of the basic sciences. Such an educational equipment and intellectual attitude would inevitably result in raising greatly the efficacy and quality of our teaching.

### **Scientific Basis Essential**

Since in a very real sense forestry is a melting pot, particularly of the biological sciences, such courses as silvics and silviculture must rest firmly on plant physiology, plant ecology and soil sciences, otherwise they are largely empirical and merely descriptive. To have real substance forest mensuration must have a foundation of statistics; forest valuation and forest economics must fit in the general economic picture; dendrology must be based upon taxonomic botany; and wood preservation upon forest pathology, forest entomology, physics and chemistry.

But we passed, or should have passed, the descriptive phase in forestry investigations and if we would keep abreast of the great strides in the sciences upon which our practices are based, we must be prepared to use the latest intensive methods and the most modern tools of every science and sub-science that impinges on our problems in forestry. We must at least be conversant with their literatures and be able to separate the relevant from the irrelevant.

This does not mean that the content of courses offered in forest schools should become a discordant and diluted mixture of different sciences, descriptive and factual data. Such an educational *pot pourri* would be much worse than a well organized course of factual material without the fortification of the sciences. Both the teacher and the student must develop a clear cut conception of practical procedures in the light of fundamental scientific investigation.

### **Research Is Necessary**

If more attention were given by forestry educators to the sciences in all fields of forestry, I feel sure that the desire for an opportunity to conduct independent researches would be greatly intensified. It is rather

discouraging to note the complacent acceptance by certain forestry educators of the fact that they have neither the time nor the facilities to conduct researches. To be sure, there may be some grumbling and some weakly expressed dissatisfaction concerning the existing conditions, but where is the militant, aggressive, intelligent attitude to effect desirable changes? Furthermore, the paucity of independent researches in some quarters cannot always be ascribed to the lack of time and facilities. If the spirit and desire to do research are strong enough few obstacles will prevent it. Few men with a consuming interest in their profession will be satisfied unless they too are making at least a small contribution to the world's knowledge.

It seems obvious, therefore, that the inculcation of the basic sciences may at least assist in correcting that all too prevalent and, unfortunately, to some extent, justified belief that forest education might be raised to higher levels of intellectual and educational achievement.

The second relationship of the sciences to forestry and forest education concerns the training of the individual student to meet the complex problems likely to confront him in the practice of his profession.

### **Trend Is Toward Specialization**

The problems confronting the forest school graduate of 25 or 30 years ago in the practice of his profession were comparatively simple. More important still, the student acquired, while in college residence much of the information and many of the skills needed in the work expected of him later. Due not only to the rapid development and diversification of forest activities, but also to a rapidly changing social complex, it is no longer possible, even if it were desirable, to train a student for all the activities in his chosen professional field. Most forest schools are no longer attempting to give exactly the same instruction to all their students. Specialized curricula in lumbering, logging engineering, forest protection, grazing, general forestry, the forest sciences, forest recreation and other branches have been developed in response to the variety and complexity of activities in the more general field, and in response also to the growth and importance of these various fields of specialization. It is obviously impossible to cover the entire field in a four or five years' course.

### **Balance Is Needed**

But despite these opportunities to specialize in different fields of forestry, there is still room for great improvement in proper student orientation. We all realize that certain students major in general forestry, a curriculum designed to prepare men for forest production, only to find employment in the paper industry, in the lumber business or elsewhere, whereas other students who may have prepared themselves for the lumber business may find employment in the Federal Forest Service.

Fortuitous circumstances and other factors greatly influence the ultimate occupation of the individual. Despite the fact that vocational adjustment is largely the individual student's problem and responsibility, vocational maladjustments are of such common occurrence that the forest schools should take some cognizance of the problem. They should



see to it that, insofar as possible, and irrespective of the curriculum in which the student majors, that the curriculum permits and insists upon sufficient breadth of training, and that it includes such real substance that the course of study may be worth while for any field of activity. Adequate training in the sciences and in the scientific method in any or all of the various forestry curricula will greatly enhance the value of those curricula for all purposes.

But it is not to the educationally maladjusted student that I wish to refer. Rather would I emphasize the relationship of the sciences to the training of the educationally adjusted; that is, to the training of those students who really do the things for which they prepare themselves in college.

It is a patent fact that, even though a student prepares himself for Government forestry work and ultimately attains that objective, he may be called upon to do any one of a great number of things. For example, he may be assigned to timber-sale work, to a forest experiment station, to land examination, or to any one of the large number of activities of the Forest Service. Five years later he may find himself in still other activities, and ten years later in still other activities.

### **Fundamentals Should Have Right-of-Way**

This emphasizes the need of giving even the forest practitioner while in college information and training in fundamental relationships rather than descriptive information of some of the tasks he may never be called upon to do.

A consideration of fundamental concepts, relationships and principles should have the educational right-of-way in all our teaching. Descriptive courses dealing chiefly with factual data have their place in rounding out a course of study, but such courses will not and never can be substitutes for those courses in which fundamental principles and relationships are taught.

It is possible, for example, to teach silviculture in a wholly descriptive manner. The student may be taught the relative tolerance of all the commercial trees in America. He may be taught that the black walnut requires a rich, well drained loam and that the jack pine grows well on sandy soil, that the black spruce will tolerate acid swamps. He may be taught that the Douglas fir and the western hemlock are often found in mixture and that the western hemlock is the climax type.

If the student later finds himself dealing with the trees and the types, the silvical and silvicultural characteristics of which he has studied while in college he may do, in an empirical way, that which is expected of him.

But how much intelligent thinking can such a man do concerning his everyday tasks? What contribution can he make towards their improvement? How valuable would this information be should the particular student find himself in charge of a rubber plantation in Liberia? Is such teaching on a sound university level?

The answers to these questions are obvious. It would have been far sounder both from a practical and from an educational standpoint to have taught the student silvics and silviculture on a plant physiological and ecological basis.

## Principles of Plant Growth Are Constant

In the latter approach the emphasis would be placed on the growth of the individual tree, the influence of environment on the tree and the tree's influence on its environment. Fundamental principles of plant growth do not change with locality and a student well grounded in them will have the working tools of silviculture whether he finds himself ultimately in Maine or Madagascar.

The great English biologist, J. Arthur Thompson, recently has called attention to the fact that the biologist works with three coordinates, the organism, its functions, and the environment. "These," he says, "are the three sides of the biological prism. At times, what is observed is the insurgent organism acting on its environment, both animate and inanimate, but at other times, and just as familiarly, the environment closes in on the organism, stimulating or inhibiting, fostering or weathering, warming or cooling, feeding or starving."

In a very real sense even the forest practitioner is a biologist. Above all, he must know his organisms—the trees and other plants and shrubs associated with them in the forest, the functions of the trees and the environmental factors which influence the forest. This knowledge can not be attained by a descriptive consideration of trees or of the forest.

Unlike the biologist, the forester is seldom interested in the tree *per se*. Rather he is interested in the tree from an utilitarian standpoint, and I do not here use the word "utilitarian" in a restricted sense. He is interested in the forest and the forest is more than a group of individual trees. Thus the forester is dealing with a more complex biological problem than that which ordinarily confronts the biologist, and his training therefore must be even more extensive than that of the biologist.

## The Forest Is a Dynamic Entity

I can not leave this phase of the discussion without an additional word concerning the forest. For some time I have felt that all foresters themselves have not yet grasped all the implications of what is meant by the word "forest." The forest is a biological entity. Each tree of that entity is influenced by the sum total of the external circumstances that surround it. Chief among these are the climatic factors, precipitation, illumination, the soil and the biological factors. In the forest, as elsewhere, man has not been the least important nor the least influential of the biological factors. Furthermore, the forest must be regarded as a dynamic rather than a static relationship. The forest of today is but a link between the forest of the past and that of the future.

To mold and to manage such a complex biological entity as a forest requires skill, judgment, and a knowledge of many sciences. The forest will ever be a challenge to the best and most intelligent efforts of the forester. To him who has adequate knowledge of all the interacting factors influencing its growth and development, the forest will always be an object of consuming interest. To him who does not have this knowledge it will be but a commercial commodity.

## Relation Of Science To Courses Vital

I now come to the third, and last, relationship of the sciences to forest education. Namely, the relationship of those sciences to the actual courses ordinarily taught in the forest school. From many points of view this is by far the most interesting and important relationship.

I have long maintained that much of the subject material dealt with in the forest school is *science* and that it is high time that this fact be recognized, especially by those of us who may be responsible for the teaching of such subject material.

It does not follow that anatomy taught in the medical school is any the less biology merely because it is taught in a medical school; are calculus and mechanics any the less mathematics because they may be taught in a college of engineering? Need courses in soils be any the less scientific because they may be taught in the agricultural college? Is bio-chemistry any the less scientific merely because it is not taught in the school of chemistry? Is plant pathology any the less science merely because it is included in the college of agriculture? The answer to this question is most emphatically, no!—but it all depends on the individual teaching the course in question.

It is an incontrovertible fact that the course in animal genetics taught in the division of poultry of the College of Agriculture, University of Minnesota, is as scientific, as scholarly and as highly prized by scholars competent to judge as it would be were it taught in the College of Literature, Science and the Arts, or in any other department of the University. Certain members of the staff in the division of plant pathology and botany, and the division of bio-chemistry, both included in the College of Agriculture, University of Minnesota, are recognized as among the outstanding scientists of the University. It is clear, therefore, that the subject matter of certain forestry courses need not be less scientific or fundamental merely because they are taught in the forest school.

## Teacher Determines Quality Of Education

The training and interests of the teacher are infinitely more important in determining the character and quality of teaching than the mere administrative unit of the university in which he finds himself. More important too are they than the physical equipment or the facilities, important as these may be, with which he is supplied. The true scientist will always teach science irrespective of the name of the course in the college catalog. The outstanding need in forest education, as in every other field of education, is scholarly teachers able to develop in their students that intellectual curiosity which can be satisfied only by high intellectual achievement.

The New York State College of Forestry has gone far in demonstrating that certain courses in forestry are specialized fields of the sciences, and that they may be dealt with on the same high level as other courses in the sciences. The researches of some of your departments are outstanding and in no sense less "scientific" than similar researches emanating from departments of pure science.

What you are doing here has had, and will continue to have, a great influence on the future course of forest education in America. But, despite the progress that you have already made, you can and, I am sure, will go still further. The rest of us may have some difficulty in following the course set by you, but we know that this course is right and that it will eventually lead us to the port of higher educational standards.

### **Science Is Positive Knowledge**

Dr. George Sarton, in his *Introduction to the History of Science*, has defined science as "systematized positive knowledge." It seems to me that it must be apparent to anyone who has given the question adequate consideration that dendrology, silvics, silviculture, wood structure, timber mechanics, wood chemistry and other subjects meet Dr. Sarton's definition or any other definition of a science.

In a sense, too, these courses cover specialized fields of the physical and biological sciences. Other courses taught in forest schools, such as forest economics, forest valuation, forest management, and forest history and policy are in a very real sense specialized fields of social or economic science. The recognition and acceptance of this intimate relationship between our field of educational endeavor and the fields of the physical, biological and social sciences is essential if forest education is to reach its highest development.

I would not for a moment wish to be misunderstood in saying that we foresters have been entirely unmindful of the foundations of our intellectual activities. Far from it. I think that foresters have every reason for feeling no small amount of pride because of the progress that has been made in the advancement of forestry education in America, largely during the past thirty years.

During these thirty years an American forestry literature truly worthy of the name has been developed, many contributions to science and public welfare have been made, and real progress has been made in a clearer and better understanding of the biological and economical aspects of forest growth and forest utilization.

### **Truth Should Be Goal**

But, despite this gratifying progress, there is still much chaff mixed with the grain. I do not wish to dwell upon this point, but will only call attention to what we all know. Even a cursory consideration of forestry literature shows that much trifling and superficial material clutters up our journals and bulletins. Too often foresters attempt to be prophets rather than fact finders. Too often we are inclined to substantiate some preconceived notion rather than to determine the truth. This attitude of mind can undoubtedly be excused, at least in part, because of the fact that just a few years ago a forester, above anything else, had to be a militant crusader and only too often was it necessary to influence public opinion with heat, when light failed to achieve the desired purpose.

In my opinion we are now approaching the end of the second era of forest education and we are about to enter the third. So far our



researches and teaching have been largely descriptive and empirical. It necessarily follows that the silvicultural management of the forest has been quite largely empirical. There are still vast amounts of descriptive and empirical data yet to be collected, and for some years, too, our silvicultural management of the forest will of necessity be based largely upon such experimentation. It is more than likely that our Federal Forest Experiment Stations will and should busy themselves with this type of work for an appreciable number of years.

At the same time it seems to me that in certain quarters at least, and this great forest school is an outstanding example, a program of basic scientific research in forestry is taking form. It is inevitable that in general this type of research program should be developed first in the forest schools because ours is the responsibility of training the men to carry it on.

Even in the forest schools the transition from descriptive and empirical research will not and should not be too rapid. Before much progress is made, new techniques will have to be developed and a new type of forest investigator trained. Nevertheless, it is highly important that when one of those rare souls with the training, the ability, and the desire to carry on basic researches appears in our forest schools, he be encouraged even though it may be difficult to determine how the results of his researches fit in or contribute to the solution of the immediate forestry problems of the day.

In this discussion of the question of relationship of the physical and biological sciences to forest education, I am only too well aware of the fact that I may have given the impression that forestry education should consist largely of better training in the sciences. If I have left this impression, it has been wholly unintentional. Forestry education is more than training in the sciences. In other words, to train a man in the sciences is not to train him in forestry. Forest science is a real and genuine science.

### **Practical Aspects Like Leaven**

It is still necessary, and probably always will be necessary, to train foresters in the more practical aspects of forest production, forest management and forest utilization, and this work is and should be what the leaven is to the loaf. A consideration of these more or less practical aspects of forestry will assist in keeping the forester's feet on the ground, in indicating to him probable lines of productive research, in giving more realism to that research and to better qualify him to make a significant contribution to human living.

And furthermore, as educational institutions, we must never forget that we have a definite and direct responsibility to equip our students for everyday life and the responsibility of citizenship. Therefore, in placing greater emphasis on the sciences in forest education, care must be taken not to neglect the emphasis placed on the broader aspects of education and its ultimate purposes.

During these trying times through which we are now passing, many organizations, institutions and individuals are subjecting themselves to a searching self-analysis in an attempt to determine how the services

they, as institutions or as individuals, contribute to the general social welfare.

Now it is perfectly apparent that many people graduate from our universities without knowing the essence of a higher education. After simply undergoing a period of vocational training, many students come out of the universities simply as bookkeepers, lawyers, doctors, foresters, nutrition specialists, or school teachers. Have they absorbed a real higher education? What insight have they gained into life and its values? How well have they been prepared, as Milton described the educated man, "to perform justly, skilfully and magnanimously, all the offices both private and public, of peace and war?"

No,—the mere accumulation of facts, important though they may be does not in itself constitute an education or assure that the man possessing them will be himself successful, or successful in serving the community at large. Great scholars are not always the best teachers. A banker's understanding of human nature is no less important than his knowledge of securities. A lawyer, to sway juries, must know more than law. Something else is needed. Edward Everett's oration at Gettysburg, despite conspicuous culture, scholarship, learning and breadth of vision, was forgotten almost as soon as it was delivered. Yet Lincoln, this self-taught man, with limited knowledge of the classics, in simple words uttered what was itself to become a classic and what will be remembered as long as a feeling of pride or of humility remains in the American breast.

### Forest Education At Crossroads

Forest education is now at the crossroads. Largely in our hands rests the future of forestry. Whether forestry degenerates into a vocation or whether it takes its rightful place among the learned professions depends largely upon our course of action during the next twenty-five years. We have the power to make of forestry what we will. Let us accept that power with humility, courage and understanding. Let us seriously study the course of development of the older learned professions. Let us choose that course of action upon which we may build most securely and which is most likely to dignify our profession.

This course of action may not be the easiest one to take. It may involve many sacrifices. It will invite criticism. It is certain to involve more profound training for those who teach the foresters of the future. No profession can rise much above the institutions that prepare men for it. Are we willing and ready to meet squarely the issues that confront us?

And let us remember that there is something else which must be added to the profoundest learning to make it effective in life and in human relationships. That something has been called various names, but I prefer to call it the "understanding heart." Without this quality scholarship and learning are but tinkling cymbals—with it even limited knowledge may sway millions. Above all, then, whatever else we may include in our curricula, let us make the "understanding heart" the goal of our educational processes.



## FORESTRY AS AN AGENCY OF SOCIAL PROGRESS

By L. F. Kneipp, Assistant Forester, United States Forest  
Service in Charge of Lands

**N**OTWITHSTANDING many suggestions to the contrary, it does not seem probable that our present social and economic institutions are to be abolished. They are too firmly grounded in the varieties and realities of all human experience. But it does seem evident that they are to be subject to many profound and fundamental changes. Spurred on by the present situation we will seek for and adopt measures promising greater assurance of human happiness, economic security, and cultural and political progress than has thus far been attained. This fact imposes upon foresters the inescapable necessity to define and emphasize the true part and place of forestry in this new, impending social order, its true potentialities for human service and progress in the Nation's future history.

### On Verge Of Land-Use Era

We are on the verge of a new era of land-use planning; a new epoch in the land economy of the Nation. Past wasteful misdirection of human energies and economic resources in the use of lands and their products has exacted heavy penalties. The need for a new order of systematic analysis of the social potentialities of lands, of readjustments of population and industry to fundamental conditions as so determined, daily is recognized by new agencies and interests. The problem is of staggering proportions. To solve it, drastic changes will have to be made in units of local government, in industries, and in governmental policies. We must study anew the probable proportions of our future population, forecast its essential needs, and factually determine the forms and methods of use and management through which the Nation's soils resources can best meet the needs thus determined.

All available data indicate that in the 48 States at least 500 million acres of land is better adapted to the production of forests than to any other social purpose. That, roughly, is one-fourth the total land area of the Nation. This fact imposes upon the foresters of the United States an obligation that challenges the imagination. The product of their efforts will determine the distribution and living standards of much of the future population, the scope and extent of vast industries, the destiny and greatness of many cities.

It is the common tendency of foresters to begin in the woods and work outward as far as their imaginations will carry them. They might secure a truer picture of their functions and responsibilities if they mastered first the complex requirements of some vast metropolis and worked by successive steps towards the forest as an agency through which those requirements could be satisfied. Only by seeing their function in its true proportions can they avoid becoming merely drawers of water and hewers of wood.

## Forestry Is a Social Process

Generalizing, forestry in its past manifestations largely has been a biological and economic process. It has dealt with soils, trees, and the elements of nature, with the primary objective of producing the largest or most valuable volume of timber or the highest net cash return. The other major consideration has been watershed protection. This concept of forestry has limited its field and its popular appeal. To realize its true significance, forestry must be regarded as a social process, its objective to realize through the agency of trees and from certain parts of the Nation's land area the fullest attainable enrichment of human life, the largest practicable measure of human security and advancement. So regarded, with such objectives, it can be made a vital and major influence in the Nation's progress towards new goals of human liberty.

Society can progress only as it provides its individual members adequate opportunity for creative and remunerative employment, makes fully possible the constructive use of human energies in the transformation of products of the soils and mines into objects of utility or forms of social and economic service for which there is use and need. The unique quality of the forest as a field of profitable and pleasant human endeavor is obvious.

An appraisal of its possibilities should not be made in the light of past conditions where isolation, primitive institutions, the availability of only human and animal power, the low values attendant upon large surpluses, limited the attractiveness of forest civilizations; but rather in the light of the impending order where the availability of abundant power, ease of transportation, stable demand, close contact with economic centers, modern institutions and conveniences, and pleasing environments will place forest activities on a plane which compares favorably with other forms of creative work.

## Must Study Consequences

To get the true social and economic significance of forestry one must study the successive extensions and multiplications of its consequences; envision it as the supporting force of homes, commercial enterprises, factories, railroads, educational institutions, professional activities, political institutions. The value of a tree stem as it is severed from the stump is only a small part of its ultimate value. The processes of its manufacture may increase the stumpage value ten-fold. The greater value is distributed to the home builder, the groceryman, and butcher, the dry-goods merchant, the doctor, dentist, educator, lawyer, actor, artist, railroad man, machinery manufacturer.

The value of the tree standing as an element of scenic beauty and inspiration may be many times greater than as an article of trade. As a living entity the tree may be a priceless historic record, an example of the workings of nature, an animate text book in natural philosophy; rendering intangible services not otherwise available.

## More In Forestry Than Dollars

The Forest Advisory Committee to the Michigan Conservation Commission recently submitted a report which is outstanding in its frank recognition of the present forest situation in that State and in constructive suggestions for its improvement. Referring to the organized management of lands revested in the State by tax delinquency it makes this significant statement:

The Committee would prefer to use the term 'State Forests' as constituting a more distinctive and more appropriate designation. It hesitates to do so, however, for fear of causing misunderstanding on the part of those to whom 'forests' and 'forestry' unfortunately imply only the growing of trees for commercial utilization.

The economic aspects of forestry need no defense. Adequate supplies of wood are essential to our comfort and culture. And we know now that only through the systematic and creative processes of forestry can we guarantee the future supplies of wood upon which our social and economic well-being will depend.

Wood is the one natural resource man can renew, the one which by the very processes of its renewal also renews or perpetuates other essentials of life. Its competitors, other than those of its own creation, are exhaustible and rapidly are being exhausted. Its potentialities are almost unlimited. It now enters in to the production of some 4,000 different articles of use, and through the agencies of science and research that number is steadily increasing. The possibilities of wood as a readily available and easily replenished source of energy are relatively unexploited. Its future economic significance and destiny conceivably may transcend all prevailing concepts.

But foresters would be blindly indifferent to the possibilities of their chosen profession, to their obligations to their fellow men, if they chose to regard the production of timber commodities as the sole end and aim of forests and forestry. To properly evaluate the functions of forestry it must be appraised in the light of probable social and economic trends rather than in that of history.

## Need New Study

Man's historical use and appreciation of forests has been more complete than his historical use of water or coal or metals, but the progress made in realizing fully the potentialities of those resources undoubtedly can be equalled or surpassed in the field of forestry. The use of forests by man has been so continuous and so relatively satisfying as to minimize the incentive to experiment and explore and fully realize all of their myriad possibilities of service to humanity. Particularly do the social and intangible elements deserve new study and full fruition.

One striking quality of forests is their power of multiple service. Under sound principles of management, a single tract of land may provide timber for industrial use, fuel, scenic beauty, recreational oppor-

tunity, stability, and purity of streamflow, soil protection, a habitat for wild life, plants, fruits, flowers, and foliage. Few other uses of lands provide so numerous and abundantly for human needs.

Forestry therefore is, or can be made, infinitely more than a biological and industrial process. To those who choose to dedicate to it their full service and ability it can be made a way of life, rich and full in its compensations. In that category may be included not alone the professional forester but all that vast group who find in the forest the fullest and most satisfying employment of their creative energies, the greatest measure of economic independence, the maximum opportunity to give form to their hopes and ambitions.

Out of the forests can grow many small wood-using communities, stable, permanent, economically self-sufficient, providing in ample measure all of the contentment, beauty, cultural opportunity and certainty of the future requisite to a rich and satisfying life. To other than forest dwellers, the farmer, the miner, the factory worker, forestry may, and can, provide a logical correlary to their basic activities, widen their horizons, make profitable and productive energies and talents otherwise without productive use.

### **Forest Is Laboratory of Nature**

As a laboratory of nature, the forest possesses a tremendous significance in the fields of science and education. It is a living vital manifestation of the operation of a wide and complex array of natural laws, an object lesson in the natural sciences, an inspiration to artistic thought and appreciation.

The power of the forest to stimulate spiritual qualities is undisputed. It is an effective antidote to the depressive influence of the mechanized and repetitive forms of industrial activity in which so many men and women must now engage; to the increasing drain upon nervous and physical energies attendant upon current and prospective forms of metropolitan existence. For the preservation of many forms of wild life, with which this country was once so generously endowed, forests are indispensable. As conservers of soil resources, as important factors in stabilizing streamflow, the role of the forests can hardly be overemphasized.

### **Forest Unrivalled for Recreation**

As a field for the popular forms of outdoor recreation the forest has few rivals. Without disparagement of the inspirational and recreational qualities of ocean, lake and river shores, or wide expanses of prairie or desert, or great naked peaks, one properly may contend that in the forests people most fully realize their love of nature and secure their greatest spiritual and physical stimulation.

At all events, the record of every State and National Forest shows a consistent rise in numbers of visitors. In the National Forests there has been a ten-fold increase since 1917; in 1932 over 24 million transient motorists passed through them and over eight million people lived in their summer homes and resorts or patronized their picnic and



camp grounds. No doubt the State Forest use has similarly multiplied. As leisure time increases, more roads built, more motor cars made available, still greater numbers will find in the forests the most satisfying of true re-creation. The public forest, with its simple and democratic conditions of public use, its beauty and interest, its proximity to centers of population undoubtedly will play a major part in the future provision of the outdoor facilities requisite to the mental and physical well-being of our people.

Conceding much of this, many foresters yet may question the part and place of the social functions of forestry in the field of forest management, may point out that many of them yield no cash returns; that their benefits are wholly intangible and manifest themselves in forms of better citizenship, happier attitudes of mind, healthier bodies, rather than in merchantable commodities, or current returns upon invested capital. All of which is true. But forestry is assuming new aspects, is at this moment undergoing profound changes.

The best available data seem incontrovertibly to show that from now on it must be more of a public function; that inexorable economic forces will in time, and that shortly, greatly diminish the private ownership and operation of forest properties, making public ownership the alternative to abandonment, waste, and deterioration of a great natural resource. And public forestry can, should, must recognize the social aspects, the obvious necessities of existence which forests are so well qualified to supply.

### **Service Recognizes Social Side**

The Forest Service, in its management of the National Forests, is now doing that. It has designated 57 Primitive Areas, containing almost 10 million acres, within which, so far as practicable, the primitive conditions of the old order will be maintained for the interest and education of the recreationists. It has at least partially developed about 2,000 public camp grounds. It has made available areas suitable for summer homes, of which over 11,000 are now under permit, and for camps and resorts which now number almost 1,200. It is systematically conserving the natural beauty of the lands adjoining the highways and roads, so managing its timber-sale operations as to safeguard important scenic values, and so regulating grazing use that it will not conflict with public use and enjoyment of the National Forests. It has found that these things can all be done without appreciable conflict with the primary purposes and functions of the National Forests, without inordinate administrative outlay and without serious detriment to the commerce and industry of the region.

### **Social Values Not Appreciated**

Life's ironic rule is that values are never fully appreciated until they are irretrievably lost. But some check upon the soundness of the claims of forestry can be effected through the hypothesis that present forest values no longer exist. Assume that through economic blindness, selfishness, inattention, and neglect, the forests of the United States were allowed to deteriorate into such haphazard collections of trees as might

survive all the adverse influences to which they were subjected. What would be the social and economic consequences?

Man would endure and persist, of course, but in an environment that would bear heavily on the spiritual side of his personality. Many destructive forces of nature would go unchecked. The vast industrial structure based on forests would dwindle, its economic values would shrink, the employment it now affords would be greatly diminished. Cultural standards would retrogress, the social and political institutions now so largely supported by forestry would suffer drastic modification. Our great wealth of wild life largely would disappear, unrestrained torrents would transport priceless soils to choke channels of navigation and blanket fertile fields.

### **Reality Must Reward Vision**

I have no doubt that the man or men who made this building possible had visions of the part of forestry in our future life equalling or probably transcending the picture I have attempted to lay before you; saw forestry as a great primary process of social organization, a means whereby men and women could attain economic liberty, spiritual freedom, the knowledge that enriches and beautifies life, the contentment of years well spent and richly enjoyed. Upon every man and woman now here, upon every man or woman who in this building in the years to come establishes the foundation of their life's career, there is an obligation that is almost sacred, to give reality to the vision by which this building was inspired. That obligation involves no personal sacrifice; it will carry the compensation of a full and worth-while life.



## SYSTEMATIC BOTANY AND FORESTRY

By E. D. Merrill, Director, New York Botanical Garden

**I**N the popular mind a botanist is an individual who can name plants. He may be an amateur whose whole available literature perhaps consists of but a few descriptive manuals or local floras, but who has acquired an intensive working knowledge of the flora of the region in which he is interested, or he may be a professional having available an extensive reference herbarium and library.

It has not frequently occurred that an amateur with no formal training and with very limited facilities has become an absolute master of his field and his subject, and has developed into a productive research man either on amateur status or as a professional. In the field of systematic botany, as in other fields, the man who attains success is almost invariably one who has developed a deep and abiding interest in his subject, and one who subordinates most other activities to the development of his knowledge of plants, their names, and their relationships.

### New Developments Bring Specialization

From the time of Linnaeus to well toward the close of the last century, systematic botany was the dominant field in plant science, but with the development of new subjects, including plant physiology, phytogeography, phytopathology, bacteriology, morphology, ecology, cytology, forestry, genetics and plant breeding, botanists increased their tendency to become specialists, limiting their inquiries to some one restricted field in these newer aspects of the science.

This was partly because of their special interests, partly because of the training they received in this new school of botany, and partly because there were very few professional openings in systematic botany. In some quarters it even became the fashion to belittle the older narrow field of taxonomy, to the extent sometimes of eliminating instruction in systematic botany and minimizing field work.

No one would advocate a return to the type of botanical instruction current in American institutions during the middle decades of the last century. There is, however, much evidence to the effect that in the extreme changes that have taken place in botanical instruction much of value has been lost which, with a better balanced course, might have been retained. In most American institutions botany has resolved itself into intensive detailed laboratory studies of minutiae, where the average graduate and post-graduate finishes with a deep knowledge of technique and of minor details of some phase of plant science, and general ideas on life histories, morphology and physiology, but with little knowledge of plants as such and even less regarding their scientific names and the significance of such names.

The tendency for each school of instruction is to perpetuate itself. Consequently, in our day, even though most professional men realize

the fundamental position that systematic botany occupies in plant science, they also find it exceedingly difficult to secure the services of competent and experienced systematists, for the reason that few taxonomists are now being trained in professional schools.

After all, botanists, no matter what their field, must know the names of the organisms to which their researches appertain, and while systematic botany may be minimized, it cannot safely be ignored. As testimony to this we find from time to time technical, morphological and other papers based on erroneously named plants, a classical example of which is Webb's\* study of *Spiraea*, where the material used was not

### Botany Plays Important Part in Forestry

Forestry as a profession is not very old in the United States. It has very rapidly come into its own. In opening my discussion on systematic botany in relation to forestry, I feel entirely safe in making the assertion that the forester must know his tree species; in some fields of forestry he must go much further and know not only his trees but also the entire simple or complex forest flora, including the shrubs and ground cover; and if he elects to specialize in the grazing field as related to forestry he must also know all the plants—grasses, herbs and shrubs—utilized by grazing animals; and to understand his problems he must know his ecology, and ecology without the correct names of plants involved is a barren waste.

Foresters concerned with various phases of afforestation or extensive planting schemes may well guard themselves against serious errors by insisting on proper botanical identification of the species with which they deal. It is no accident that certain species are adapted to certain climatic and soil conditions, and that others are delimited in nature, as to their occurrence, by altitude or other factors.

Not infrequently species requiring entirely different environmental conditions for successful growth superficially very closely resemble each other. Success or failure may be predetermined by the selection of the materials used, and very serious mistakes have been made through the assumption that an oak was an oak, or a pine was a pine, without taking into consideration that in both groups there are many scores of different species, each requiring a certain combination of environmental factors. In this particular field systematic botany can and should serve practical forestry, but foresters themselves should be alive to the opportunities for assistance offered by it.

### Broad Field Requires Basic Knowledge

Were the total number of economic trees limited to a comparatively few species, as is the case in the continental United States, and were

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\* Webb, J. E. A morphological study of the flower and embryo of *Spiraea*. Bot. Gaz. 33: 451-460, f. 1-28. 1902. For a note on the botanical identity of the material studied see Rehder, A. *op. cit.* 34: 246. 1902. from *Spiraea* at all, but from *Astilbe*; *Spiraea* being a representative of the Rosaceae, *Astilbe* of the Saxifragaceae.

all species supplied with invariably applied common names, no one would advocate any great knowledge of the scientific names of plants on the part of professional foresters. The graduate forester, however, never knows where his profession will lead him. If he be stationed in a region with a poor arborescent flora, as to the number of distinct species, his task of learning the names and relationships of these few species is relatively simple.

Again, in most parts of the United States published descriptive floras are now available, whether the areas be the northeastern states, the southern states, the prairies and plains region, the Rocky Mountain region, the northwest, or the Pacific coast. All trained foresters should know how to use local floras for making current identifications. If such publications are not available, local botanists or any one of several of the larger botanical institutions can very readily and promptly supply accurate botanical identifications. His task is simple in the extreme.

But let us suppose that our forester's profession takes him to China, the Philippines, Sumatra, tropical Africa, the West Indies, or to Mexico or Central or South America. The contrast with United States conditions is striking. There are few resident botanists and fewer botanical institutions. There are, in general, no available published floras for his use. Add to this condition the fact that in all the regions above mentioned the arborescent flora is infinitely richer in species than is the United States, the forests in all humid tropical regions being highly complex, and we find that our forester, if he is to be successful, must develop his botanical knowledge.

By way of contrast with conditions at home, where in all of North America north of Mexico there are probably less than 750 native species of shrubs and trees, in the Philippines with a land area slightly less than that of the New England States and New York combined, between 2,500 and 3,000 different species of woody plants are now known. An actual census of the arborescent vegetation on an area of about 8,000 square feet in the primary forest on Mount Mariveles, Luzon, gave the surprising total of 126 trees representing 50 different species. My judgment would be that in the entire Malay Archipelago the number of woody plants alone approximates 12,000 species.

These figures are cited to indicate the complex nature of the aborescent floras in humid tropical regions; the number of species in many parts of tropical Africa and tropical America, in comparable areas, would approximate those for the Philippine forests.

## **Principles of Systematic Botany Valuable Aid**

In these tropical forests only a small percentage of the species are of commercial value, yet the forester must learn to distinguish between the commercially valuable and the valueless species. Not infrequently a knowledge of the family characters will enable him to segregate the commercial from the non-commercial trees. Rarely in the tropics will his problem be simplified by gregarious forests where all the trees represent one species, as in our pine or spruce forests, though occasionally



he will find semi-gregarious forests where the majority of the trees in a given area may represent one species, as in the sal forests of India.

If there is any place in the world where a knowledge of the principles of systematic botany will aid the forester, it is in the tropics where to a very considerable degree he is master of his own fate as a professional man, and his fate may be decided by his knowledge or lack of knowledge how to proceed in acquiring the botanical data essential to his needs.

One may query, why learn the scientific names of plants when local names are available? Teak is teak, balsa is balsa, and mahogany is sometimes mahogany; but in Australia, oak, pine, maple, and other well known English tree names are applied to species totally unrelated to their European and American prototypes. With us, even, Oregon pine isn't a pine at all, but to replace in the lumber trade the commercially established name, Oregon pine, by the more correctly descriptive Douglas fir is a most difficult task.

In the Philippines for about 8,500 different species of plants about 13,000 different native names are recorded. Most of these are surprisingly restricted in applications to individual species or groups of very closely allied ones. Yet among the commercially important timber trees I find recorded for two different species of *Dipterocarpus* 20 different native names each, for one *Anisoptera* 23, for one *Pentacme* 30, for the one *Shorea* 35, for one *Parashorea* 22, and for one *Vatica* 37. For a single species such as *Pterocarpus indicus* such variants as *asana*, *bital*, *daitanag*, *hagad*, *nara*, *naga*, *sagat* and *vitali* are recorded; not one of these local names suggest *padouk* yet this particular species yields the timber commercially known as *padouk*, under which name it is established in the world markets.

If it were desirable to develop an export trade in *nara* from the Philippines, how illogical it would be to try to establish a new name in the trade. It might be legitimately marketed as *padouk*, or as Philippine *padouk*; and Philippine *padouk* could not possibly have the unhappy history of Philippine mahogany, for it is a true *padouk*, while the so-called Philippine mahogany has no relationship whatever with true mahogany. It is really easier sometimes to learn a Latin binomial and its application than it is to master the multitudinous local names of commercial species in such regions as the Philippines and Malaysia where about 400 different languages are spoken.

In tropical countries again, where the mixed forests are very complex and where much of the acreage is government land, forest revenues are based on the cubic measurements of the lumber cut, but the rate per cubic meter varies according to the value of the timber, class A, the most valuable timber, paying the highest rate, class B the next, and class C third. Where such systems are in vogue the timbers have been carefully classified as to groups, and the classification has more or less definitely been correlated with the scientific names of the species concerned. Here again, as a matter of standardization, systematic botany plays a very important part in this practical problem of classifying timbers for revenue purposes.

## The Better Botanist the Better Forester

Various forest products are involved besides commercial timbers and firewood, such as rattan, fibers, certain fruits and nuts, oils and resins, tanbark, cutch, percha, caoutchouc, chicle, rubber, as well as various drugs and dyes, and even ornamental plants such as orchids. In some regions regulations have been established and must be enforced to protect the natural supply. Since enforcement usually devolves upon the forest officer, here again botanical classification is involved in almost every case, and this means more Latin binomials. Indeed, in many countries the better botanist the forester is, the better forester he becomes.

In this last statement I have used the term botanist in the popular sense—a man who knows the names of plants; but the forester, who should know the names of trees, must also know the economic uses of the various species. I am not advocating that all foresters should be botanists, any more than I would advocate that all botanists should be foresters. I do, however, very strongly recommend a thorough basic training of foresters in general botany.

In such a course, I would minimize the conventional modern phases of laboratory work, including the life histories and morphology of lower forms, which consume time and effort out of all proportion to the economic importance of the plants concerned as compared to the great group of flowering plants. I would stress field plants, as well as the characters of the major families of flowering plants, particularly those which contain important aborescent species such as the Coniferae, Fagaceae, and Juglandaceae, and would orient a considerable part of the work on straight systematic botany stressing the classification and taxonomy of the arborescent groups.

I would go even further than this, and provide by lectures and other training, even to undergraduates, a knowledge of the source literature of botany, and at the same time instill some basic ideas as to centers of botanical work in the systematic field in the United States and elsewhere; this by way of instructing the student as to how and where he can secure such assistance as he may need in obtaining the correct scientific names of the various species with which he must concern himself. To know where one can turn for assistance is frequently the solution of a pressing problem.

## The Botany Foresters Should Know

As to source literature, all foresters ought to know in a general way the various published floras and forest floras that are available, not only those appertaining to the United States, but the more important ones for other countries; these data might well be compiled in the form of a special bibliography.

They ought to know how to use keys for purposes of identification, and how to check identifications by comparison with descriptions. They ought to know in a general way the scope, character and application of such basic works as Bentham & Hooker's "Genera Plantarum" and Engler & Prantl's "Die Natürlichen Pflanzenfamilien," and the uses

and limitations of such reference works as "Index Kewensis" and "Index Londinensis;" and they should at least know that monographic treatises covering all known species of various families for the entire world exist in such series as "Das Pflanzenreich" and de Candolle's "Monographie Phanerogamarum."

In making this statement I realize very fully that almost no undergraduate ever even sees such works. Many botanists who have completed their formal training for advanced degrees have never examined them, and some do not even know of their existence, and I am afraid that many teachers of modern botany would have about as little knowledge regarding them as would the average graduate student.

Why then should the forester be burdened with this special knowledge that is not required of the undergraduate specializing in botany or the post-graduate who is training himself for teaching or research or both? I would not consider it a burden for the reason that I would so modify the conventional courses in botany for foresters that much that can never be of great value to a professional forester would be eliminated and time would thus be provided for a course in botany particularly adapted to the forester's need. I do not think that the average university course in general botany is well suited to the actual needs of forestry. This statement is made after close contacts over a period of 30 years with numerous forestry graduates, the products of institutions from Maine to California.

### Identifications Returned for Duplicates

In many cases the professional forester can secure the information he may need through active and well informed systematic botanists. He should, however, know to whom he should apply. In all botanical institutions active in the systematic field it is normal procedure to make identifications without charge in return for the specimens named, and thus any species sent for identification should be represented by a retained duplicate.

In taking advantage of this situation all that is really necessary on the forester's part is a limited knowledge of the scope and activities of existing botanical institutions, and a knowledge of the very simple technique of preparing botanical specimens. He should avoid sending specimens to institutions that are not actively engaged in productive work on the flora of the region whence the specimens came.

Thus if it were material from China a logical place would be the Arnold Arboretum or the New York Botanical Garden; if it were from South America, then the United States National Herbarium, the Field Museum, or the New York Botanical Garden; if it were from Mexico any one of these institutions or the Gray Herbarium. For material from any part of the continental United States there are not only the above institutions but also the Missouri Botanical Garden, and various departments of botany in the larger educational institutions. There are even more active botanical institutions in Europe than in America, and as a rule their taxonomic interests are wider, while in various European colonies, particularly in Asia, important centers of information exist. Assistance and advice is free for the asking.



If the forester be not satisfied with his returns from one institution, there are always others to whom he may apply. The point at issue is merely that there do exist botanical institutions that can be of real service to professional foresters and those in need of such services as taxonomists can render should not hesitate to take advantage of the situation.

In this day and age we are all more or less specialists, but sometimes the disadvantage of undue specialization can be overcome by the development of selective coöperation. There is ample field for productive coöperation between systematic botanists located in various institutions where ample library and herbarium facilities are available and foresters located in the field remote from centers of botanical information, to the advantage of both groups.

# HISTORY OF FOREST EDUCATION IN THE STATE OF NEW YORK

By **Harlan H. Horner**, Assistant Commissioner for Higher  
Education, State Education Department

*Introduced by Dean Samuel N. Spring, Presiding*

NEW YORK STATE enjoys the distinction of having established the first institution in America for technical forest education. This progressive step was taken in the enactment of Chapter 122 of the Laws of 1898 which became a law on March 26 of that year. This act provided for the establishment of the New York State College of Forestry at Cornell University.

Prior to this time formal instruction in forestry in this country had largely been confined to courses set up in the land-grant colleges in connection with agricultural education. Such instruction was being given in 1898 in twenty-two land-grant colleges. Mainly the subjects of study were restricted to the economic aspects of the forest, the identification of trees and methods of planting and were presented in a brief series of lectures or, at the most, in courses extending over one or two terms. One of the very early, and perhaps the first undertaking of this kind was a series of lectures by Dr. B. E. Fernow at the Massachusetts Agricultural College in 1887.

## Need for Trained Men Unsatisfied

These fragmentary courses and short series of lectures did not, however, meet the growing need of the entire country for men thoroughly trained in forestry. The establishment of a system of forest reserves by the Federal Government, authorized by the enabling act of March 3, 1891, promptly revealed the need of professionally trained foresters. The State of New York early felt that need because of her concern about her own forests. Brief reference, therefore, to the preliminary steps which lead to the establishment of the State College of Forestry at Cornell University may be of interest.

These preliminary steps are discernible in official documents. In his annual message to the Legislature, submitted January 6, 1897, Governor Frank S. Black discussed at length the long continued neglect of our State forests and declared that—

“Every consideration of health, pleasure, economy and safety urge the speedy consideration of this subject.”

## Large Acquisitions Started in 1897

The direct result of Governor Black's message was the passage of Chapter 220 of the Laws of 1897 which created a forest preserve board, authorized the board to acquire land in the Adirondack park and con-

tained regulations relating to procedure and administration. The act made a direct appropriation of \$600,000 and authorized the Comptroller to raise a further sum of \$400,000 on bonds.

In their second annual report to the Legislature, submitted on January 20, 1897, almost coincident with Governor Black's message, the State Commissioners of Fisheries, Game and Forests, directed public attention to the State's need of scientific forest management, recommended the establishment of an experimental forest and intimated that a "forest academy well endowed from private resources" might soon follow if the State should take the lead. Discussing at length the difficulties attendant upon scientific management of the State's forests under the rigid restrictions of the State Constitution the Commissioners said—

"Although the Forest Preserve, a large part of which is primitive forest where the axe of the lumberman has never swung, is rendered unavailable by our State Constitution for any such plan, something might be done to relieve the State from the anomolous condition in which its forestry work has been placed.

In view of the proposed purchase of large areas of woodlands, a special appropriation might be made for acquiring some tract of virgin forest in the Adirondacks, to be set apart especially as an experiment station where the practicability of carrying on scientific forestry work with profit might be demonstrated. The tract thus set apart and specially dedicated to the purpose mentioned should be placed under the sole management of skilled, professional foresters, who should be afforded every opportunity for carrying on whatever technical work could be undertaken without loss."

### Experiment Station Urged

In his annual message to the Legislature, submitted on January 5, 1898, Governor Black reported that the Forest Preserve Board, created by Chapter 220 of the Laws of 1897, had acquired over two hundred and fifty thousand acres of forest land at an average cost of \$3.74 per acre. The Governor renewed vigorously his previous discussion of the State's forest problems, suggested that an experimental tract should be set aside for the promotion of scientific study and urged that it be placed in charge of the Regents of the University of the State of New York or of the trustees of Cornell University or of some similar body not subject to political change.

"The time will come," said the Governor, "when the State will sell timber to the lumberman, spruce to the pulp mills, reap a large revenue for itself and still retain the woods, open to the public, protecting the sources of water, growing and yielding under intelligent cultivation."

The prophecy of Governor Black has not yet been fulfilled. The day may come when the State will have sufficient confidence in its servants to trust them to prosecute scientific forest management within her own domain. Down through the years the principles urged and taught in an institution such as this present State College of Forestry, generously supported by the State, will be of more service to the State if a way is found to employ safely and intelligently such principles in the State forests.

## College Established at Cornell

Chapter 122 of the Laws of 1898 carried out very promptly in part the recommendations of Governor Black. This act, as has already been indicated, marks the birth of professional instruction in forestry on a full four-year college level in America. The principal provisions of the act, briefly stated, authorized

1. The establishment of the New York State College of Forestry by the Trustees of Cornell University;

2. The purchase of 30,000 acres of forest land by the Forest Preserve Board with title in the University for the purpose of conducting experiments in forestry;

3. The return of the college forest by the University to the State at the expiration of thirty years;

4. The appropriation of \$10,000 to be expended by the Trustees of Cornell University for the purposes indicated, exclusive of the purchase of land.

On April 1, 1898 the Trustees of Cornell University voted to accept the provisions of the act and on April 14 in accordance with it established a college to be known as the New York State College of Forestry. Doctor Bernhard Edward Fernow, then Chief of the United States Division of Forestry, was elected as director of the college and professor of forestry.

Doctor Fernow was born and educated in Germany and came to the United States in 1876. He very soon won wide recognition because of his thorough scholarship and his ability both as a writer and lecturer in the fields of silviculture and of practical forest management. He served with distinction for twelve years, from 1886 to 1898, as the Chief of the Division of Forestry of the United States and was identified throughout that time with every significant movement in the country related to the development of forestry. He was perhaps the chief inspiration of the Federal Act of 1891 upon which rests our present great system of National Forests. He was by common consent the best qualified man in America at the time to undertake the establishment of the first college of forestry in the country.

## Four-Year Course Set Up

Students were received for the first time in the new college in September, 1898. The object of the institution, as stated in the first announcement, was—

“To furnish instruction in the principles and practices of forestry and provide the facilities for the education especially of managers of forest properties.”

To this primary end a full four-year course was set up leading to the degree of Bachelor of Science in Forestry. The course was surrounded with the customary requirements for admission and graduation and from the beginning was ranked on the same scholarly level as all other degree courses in the University.

As soon as the college forest was in operation plans were made to transfer the junior and senior classes to the forest for the entire spring



term. Here the students were engaged under faculty guidance in sowing and planting in the nursery and the field, making improvement cuttings and thinnings, marking out regeneration cuttings, and performing other silvicultural operations, measuring trees, making yield tables, laying out roads, and making working plans for limited areas.

While emphasis was put upon the four-year professional course as the chief objective of the college, provision was made for elementary and short time courses for rangers, logging bosses, woodworkers, prospective owners of woodlands, farmers and others, and students desiring cursory acquaintance with various aspects of the subject.

### **Discontinuance Ends Rapid Growth**

Throughout its brief history the college had no building of its own and was housed wherever it could find rooms at the courtesy of other colleges and departments. Exclusive of special students from other departments there were four bona fide forestry students enrolled in the first year and seventy in the fifth and closing year. A marked expansion was just being manifested in the academic year 1902-1903 with a freshman class of thirty-eight. There were in all fifteen graduates: in 1900, 1; in 1901, 5; in 1902, 2; in 1903, 2.

The geographical distribution of the seventy students enrolled in the last year of the life of the college was as follows: From the State of New York receiving free tuition, forty-five; paying annual tuition of \$100, from New Jersey, 4; Ohio, 4; District of Columbia, 2; Michigan, 2; Pennsylvania, 2; and one each from California, Connecticut, Iowa, Louisiana, Maine, Maryland, Minnesota, West Virginia, Austria, Canada and the Philippine Islands.

Upon the failure of the State to provide the customary annual appropriation of \$10,000 for maintenance, being without funds to carry on its work, Cornell University discontinued the New York State College of Forestry in June, 1903 and dismissed the faculty.

### **Public Criticism Caused Trouble**

The reasons for this summary action are found in the public criticism of the management of the college forest which was provided for in the original act. Under its terms the Forest Preserve Board purchased from the Santa Clara Lumber Company 30,000 acres of timber land in Franklin County. The western boundary of this tract was three miles from Tupper Lake station and the center of the property was approximately at the hamlet of Axton, thirteen miles from Tupper Lake. The purchase price was \$165,000 and was paid from funds appropriated to the uses of the Forest Preserve Board.

The actual selection of the tract was made by Doctor Fernow. Cornell University was to have the title, possession, management and control of the land, was to conduct such experiments in forestry as it deemed advantageous to the State and the advancement of the science of forestry, had authority to plant, cut, raise and sell timber with a view to imparting knowledge concerning the scientific management and

use of forests; and at the expiration of thirty years was to convey the land without further consideration to the State of New York.

Governor Black in his messages to the Legislature had contemplated a forest tract for experimental purposes covered with merchantable timber that would be self-sustaining. In the first announcement of the plans for the college Doctor Fernow had said that while the college forest could not be made to demonstrate the profitableness of a business it would pay for itself.

In the light of his subsequent experience it ought, in fairness to Doctor Fernow, to be admitted that he did not by any means have an ideal situation with which to carry out his operations. The forest had been logged over in large part for its softwoods. It had therefore little merchantable spruce or pine remaining. Doctor Fernow had a difficult task before him to find a market for hardwoods and to conduct logging operations on a paying basis while attempting to conduct scientific forest management at the same time.

The property was promptly surveyed and districted, roads and lanes were laid out, an account of stock was taken and nurseries were established. At first the so-called selection system of forestry was practiced. By this system the Director designated certain trees to be cut, amounting to about 60% of a given area, and left about 40% of the trees standing.

It was expected that replanting would be made in the areas thinned by this system. It was finally decided, however, to use the so-called "clear cutting" system which meant the removal of all merchantable trees except along the streams and certain designated areas and consequent complete replanting. It was also decided that the only practical way in which the University could dispose of hardwood logs and cordwood would be to induce a manufacturer to establish a plant in the vicinity of the college forest and use the logs for staves and the cordwood for wood alcohol.

### **Sales Contract Troublesome**

Accordingly, on May 5, 1900, the Trustees of Cornell University entered into a contract to this end with the Brooklyn Cooperage Company with the understanding that the Company would have one factory ready for the manufacture of staves and headings by April, 1901 and a second factory ready for the manufacture of the products of wood distillation by November, 1901.

The arrangement did not result profitably. Despite two appropriations by the Legislature of \$30,000 each to provide working capital for the operation of the college forest coupled with the income from the Brooklyn Cooperage Company, it soon became apparent that the undertaking was not going to pay its way. During the five years of active operation of the forest 3100 acres were cleared of timber and only about 440 acres were replanted.

Summer residents in the vicinity of the forest operations began to spread the word that the experiment would result in the destruction of the forest with relatively little replanting and that the profits would go to a private industry. The Adirondack Committee of the Assembly conducted an inquiry in the summer of 1902 and reported adversely upon



the whole undertaking. Following this report of the Adirondack Committee on May 13, 1903 Governor Benjamin B. Odell vetoed the regular appropriation of \$10,000 for the maintenance of the college of forestry at Ithaca with this explanation—

“The operations of this college of forestry have been subjected to grave criticism as they have practically denuded the forest lands of the State without compensating benefits. I deem it wise, therefore, to withhold approval of this item until a more scientific and more reasonable method is pursued in the forestry of the lands now under the control of Cornell University.”

### **Litigation Result of Forest Operation**

The college was closed, as has been indicated, in June, 1903 and all operations on the college forest ceased in 1905. Cornell University took no steps except in self protection and promptly expressed a willingness to deed the forest back to the State. Litigation followed in which the Brooklyn Cooperage Company was involved, which lasted until April 17, 1912, when Cornell University deeded the experimental forest of 30,000 acres to the People of the State of New York. Thus ended the history of the first college of forestry in America.

It is a satisfaction to record that at no time during the actual operation of the college or during the subsequent litigation over the management of the college forest were the integrity and good faith of Cornell University questioned in any way by the State or by the general public. The trouble lay between the eager and possibly over confident scientist on the one hand and the uninformed lay public on the other.

Doctor Fernow justly earned among his associates and colleagues in forestry the affectionate title of Dean of Forestry in America. No criticism was ever made of the original curriculum he set up at Ithaca, nor of the way he administered the college. Indeed, that pioneering course of study established at Cornell University in 1898 stood for many years as the model for the curricula of later forest schools in various parts of the country, and Doctor Fernow's books and frequent contributions to scientific journals commanded universal respect and have, so the experts declare, stood the test of time to his enduring credit.

### **Public Not Informed**

The public, with its scant knowledge of forest science, was bound not to understand the experiment in the Adirondacks. There were prejudiced critics of the forest policy who undoubtedly sought to arouse the public against the whole undertaking. The critical public saw the clear cutting of the forest on a large scale and took little note of the replanting operations.

If Doctor Fernow had been content to cut less and plant more in the earlier years he might have carried the public with him. If he had been disposed to recognize the existence of public clamor, to say nothing of its validity, he might have been better able to cope with it. Trained in Germany where forest science was highly developed and where the public had long been accustomed to think of the forest crop in terms of

fifty or a hundred years, he did not take into account the painful ignorance of scientific forest management with which he was surrounded.

It is doubtful whether the broad-gauge, long-time, scientifically conceived policy he sought to carry out would even today win public approval. We still have the mistaken and fatuous notion in America that we preserve forests by keeping the axe out of them. We have even denied the existence of the science of forestry so far as our great State parks are concerned. It may be that Doctor Fernow caused alarm thirty years ago when he predicted that some day "the Constitutional bar will undoubtedly be removed and the entire State holdings placed under proper technical administration."

Whatever the judgment *now* of Doctor Fernow's policy *then*, it was unfortunate for the State and for the progress of forest education in the Nation that the first College of Forestry in America was so abruptly ended. We could wish, looking back from such vantage point as 1933 gives us, that Doctor Fernow might have had not less scientific attainment and skill but a bit more tolerance of even the mistaken views of laymen in authority.

Science under our American system of government has to suffer the handicaps of politics. It was fine of Doctor Fernow as a scientist not to surrender and of Cornell University as a patron of science to stand loyally by her expert. It might have been better for the State in the long run if both the University and its Director of Forestry had recognized more readily the limitations of the public's scientific knowledge, acted in more practical and diplomatic fashion in the light of those limitations and thus perhaps have saved a laudable undertaking from disaster.

### College at Syracuse Starts

From the time the first State College of Forestry was closed at Ithaca in June, 1903 not much was heard above the surface about instruction in forestry in New York State for several years. In 1910 things began to happen with a vengeance. It is not necessary to record in detail the influences manifesting themselves publicly in 1910 which shortly lead to the establishment of the New York State College of Forestry at Syracuse University and of the Department of Forestry in the State College of Agriculture at Cornell University. Certainly these influences were exerted, it may as well be said frankly, in behalf of institutions rather than fundamentally in behalf of the State.

In 1910, in the absence of any State support of forest education, an impartial jury would undoubtedly have urged that the State was justified in a renewed attempt to provide for forest education on the college level. That it should embark upon a program leading to the establishment at State expense of two four-year courses in professional forestry, no disinterested jury would have contemplated even in 1910. Let us now see in broad parallel outlines what actually took place.

On June 18, 1910 Governor Charles Evans Hughes vetoed a bill to establish an institution at Syracuse University to be known as the New York State College of Forestry.

On December 17, 1910 the Trustees of Cornell University appointed a professor of forestry in the New York State College of Agriculture.

## **College Authorized by Dix**

On July 28, 1911 Governor John A. Dix signed a bill providing for the establishment of the New York State College of Forestry at Syracuse University.

In September, 1911 elementary courses in farm forestry and silviculture were offered in the College of Agriculture at Cornell University. At the same time professional courses in forestry leading to the degree of Bachelor of Science at the end of the fourth year and to the degree of Master of Forestry at the end of the fifth year were opened at the new State College of Forestry at Syracuse University.

In September, 1912 professional courses, almost identical with those opened in Syracuse in 1911, leading to the bachelor's degree and to the degree of Master of Forestry were instituted in the College of Agriculture at Cornell.

On April 18, 1912 an appropriation of \$100,000 was made by the Legislature for a forestry building at Cornell.

On May 24, 1913 an appropriation of \$250,000 was made by the Legislature for a forestry building at Syracuse together with an appropriation of \$35,000 for equipment of the building.

On May 26, 1913 an appropriation of \$20,000 was made by the Legislature for the equipment of the new building at Cornell.

In May, 1914 the forestry building at Cornell was dedicated.

## **Main Building Dedicated in 1916**

In September, 1916 the forestry building at Syracuse was dedicated. The enrollment in professional courses at Syracuse for the first year, 1911-1912, was 52; the enrollment in the present academic year, 1932-1933, exclusive of fifty students in the Ranger School, is 406.

The enrollment in professional courses at Cornell for the first year, 1912-1913, was 42; the enrollment in the present academic year, 1932-1933, is 118.

Since the opening of the New York State College of Forestry at Syracuse in 1911 the Trustees of the College have conferred 827 degrees as follows: bachelors', 729; masters', 89; doctors', 9. There have been graduated also from the Ranger School 392 students.

Since the opening of the professional courses in forestry in the College of Agriculture in 1912 the Trustees of Cornell University have conferred 362 degrees as follows: bachelors', 288; masters', 73; doctors', 1.

The facilities of the two institutions for carrying on experimental and research work, largely the gifts of individual benefactors, should be mentioned.

## **Private Gifts Numerous**

The Arnot Forest of 1,850 acres, situated about twenty miles from Ithaca, came into the possession of Cornell University in 1927, the gift of the heirs of the estate of Mattias H. Arnot of Elmira. A gift of \$5000 from Mr. Charles Lathrop Pack enabled the University to begin the development of the property. Another gift of \$5000 from Mr. Archer M. Huntington was designed especially for the prosecution of

research activities on the Arnot Forest. Owners of forest properties in the Adirondacks and other parts of New York State and in South Carolina have been of material assistance by permitting the Department of Forestry to enter on their lands to conduct special studies. The Cornell Forestry Camp is held yearly on the property of Finch, Pruyn and Company near Newcomb. A chair in forestry soils was established by the Charles Lathrop Pack Forestry Trust at Cornell University in 1927. This research professorship is for administrative purposes located in the Department of Agronomy.

The facilities of the New York State College of Forestry for experimental and research work have been provided in part by the State and in part by private gifts. The Syracuse Forest Station of 90 acres and the Salamanca Forest Station of 1016 acres were acquired by the State. In 1912, the Rich Lumber Company presented to Syracuse University for the use of the College of Forestry a tract of 1850 acres of cut-over land near Wanakena in St Lawrence County. In December, 1929 the International Paper Company gave on like terms an adjoining tract of 500 acres. The two tracts constitute what is known as the Ranger School Forest and are the seat of the Ranger School maintained by the College.

In 1923 Charles Lathrop Pack presented to Syracuse University for the use of the College of Forestry a tract of 1000 acres situated on Cranberry Lake now known as The Charles Lathrop Pack Experimental Forest. In 1927 a tract of 2250 acres near Warrensburgh, N. Y. was presented to Syracuse University for the use of the College by the Charles Lathrop Pack Forestry Trust and is known as the Charles Lathrop Pack Demonstration Forest.

In May 1919, the Legislature authorized the establishment of the Roosevelt Wild Life Station in connection with the College of Forestry as a memorial to Theodore Roosevelt. In 1932 Archer M. and Anna Huntington presented to Syracuse University for the use of the College of Forestry and the Wild Life Station a tract of 13,000 acres situated in Essex County near Newcomb. The forest will be known as the Archer and Anna Huntington Wild Life Forest Station.

Here then is the situation in 1933. The Department of Forestry in the State College of Agriculture has a staff of 8 persons, a student body of 118 and costs the State, including overhead charges, approximately \$70,000 annually. Extension and research work are carried on to some extent but the major energies of the staff are employed in the conduct of the professional courses in forestry leading to the bachelors' and the masters' degrees.

The New York State College of Forestry has a staff of 72 persons, a student body on the college level of 406 and a Ranger School with 50 students and costs the State approximately \$350,000 annually. The scope of its activities is considerably wider than the program of the Department of Forestry including as it does, the Ranger School, the Roosevelt Wild Life Station and courses not undertaken at Cornell in landscape engineering, wood utilization, forest and park management.



## Work Duplicated in Two Schools

The point I wish to emphasize is this: The professional courses in forestry at Cornell attended by 118 students are paralleled by similar courses at Syracuse in connection with a part of its program of instruction which is now offered to 406 students. This complete duplication of forest instruction supported by the State has continued for over 20 years. The study of Forest Education recently published by Graves and Guise indicates clearly that there are more forest schools in the country than are needed and that it is exceedingly difficult to place the present number of graduates in positions which hold out promise for material advancement, even in normal times.

The present economic depression has served to bring the problem of forest education sharply to the notice of both educational and budgetary officers of the State. Out of these considerations recent steps have been taken to discontinue the professional courses in forestry leading to the bachelors' degree in the Department of Forestry at Cornell University.

This conclusion has been reached after a comprehensive study of the forestry instruction supported by the State and upon the cooperation and full agreement of the Regents of the University of the State of New York and the Trustees of Cornell University. Extension work in forestry, especially as it applies to the farm, elementary courses in wood lot management, research and graduate work in avenues such as Cornell University deems desirable will be continued at Cornell; but the chief source of duplication, the instruction of professional foresters on the undergraduate level will cease entirely. Students now in residence will be permitted to complete their courses but no students will hereafter be admitted for the bachelor degree.

## No Criticism of Cornell

It is hardly necessary to remark before any audience in New York State that in all these considerations there has been no intimation of any lack of good faith or of consistency of purpose on the part of Cornell University or of the faculty of the Department of Forestry. The present staff have all come into the service since the original plans were announced and put into operation. The original plan of offering undergraduate professional training to lay a foundation for the practice of professional forestry has been adhered to and no effort has been made to enlarge the offerings to cover the whole possible range of forestry instruction.

It is only fair to say that within the limits of the announced objectives the instruction in forestry at Cornell University has abundantly proven its academic and professional worth and has won a deservedly high place among like endeavors throughout America. The Department of Forestry now giving up its undergraduate work in the professional field is worthy of the fine traditions and of the disinterested scientific spirit of Cornell University.

The change comes about because the State at last sees that there is no justification, economic or educational, for its continued support of this duplicate effort. The cold essential facts of the situation have not any-

where been denied and the officers and trustees of Cornell University in cooperating fully with other agencies in the steps to be taken have again demonstrated their faithfulness to the State they serve.

### **New Era Dawns**

A new era therefore awaits the New York State College of Forestry, for almost coincident with the dedication of this splendid building comes the sole responsibility of the College for the undergraduate training of professional foresters at the behest of the State. There is distinct challenge to the trustees and faculty of this College in this new responsibility. This institution is today without question the best equipped, the most generously supported and the most largely attended college of forestry in America.

It is a trite but nevertheless a true statement that equipment, support, and students do not of themselves make an effective teaching institution. With modest equipment, with limited support and with rarely more than a hundred students, that little band of devoted men in the Department of Forestry at Cornell University have given us an example of the scientific spirit and of teaching zeal which has added a fine chapter to the educational heritage of the State.

I would expressly deny any attempt to draw comparisons between the quality of the instruction and research undertaken by the two institutions in the last twenty years; and I would especially point out that economic necessity and educational common sense and in no degree the character and quality of the work in the two schools entered into the determination of future policies.

At the same time in the regrettable departure of Dean Baker, whose name is so closely associated with the early history of this College and whose earnest and fruitful recent endeavors in its behalf are so fresh in our minds, I consider it more than an incident of promise that the destinies of the College should now be in the hands of a recognized scholar and teacher who endeared himself for many years to University officials, to colleagues and associates, to students and college community in a sister institution. Dean Spring in his training, personality and devotion to his profession is to me the visible assurance that the new responsibility of this College will be met.

### **College Has Reached Limit**

What I am trying to say—and I want to be understood—is this: This State College of Forestry has about reached needful physical proportions. It now has a fine group of lecture halls and laboratories next door to its kindly and helpful neighbor, Syracuse University, it has literally thousands of acres of forest lands for experimental and demonstrational purposes at its disposal through the patronage of Syracuse University, it has a unique and markedly successful Ranger School, it has a splendid summer camp, it has reasonable equipment and staff and the confidence and generous support of the State. It can well direct its major energies for many years to come toward the effective employ-



ment of the agencies it already possesses for the promotion of sound forest education.

It is easy to describe lecture halls, to catalog equipment, to count acres of woodland, to enroll large numbers of students; it is more difficult to build that intangible, spiritual inwardness which makes an educational institution worthwhile. This faculty in what may be called the building and expansion period of this College have had many difficult problems to meet; they have met these problems with a fine spirit and with the ideals of true foresters always before them. They now have a rare opportunity to make this College already in such commanding position second to none in America in the quality of its teaching and research.

### **Praises Marshall and Smith**

It is my pleasant duty this afternoon, representing the Regents of the University of the State of New York and the Commissioner of Education, to give away this fine laboratory building erected by the State of New York in the interest of forest science and in memory of a distinguished citizen of the State, the late Honorable Louis Marshall. Giving this building away is a mere figure of speech because it goes back this afternoon officially into the hands of those who inspired it and saw it to completion.

This State College of Forestry has always been fortunate in its friends. It was Alfred E. Smith, now Chairman of its Board of Trustees, into whose immediate custody this building goes today, who sponsored and urged the Constitutional amendment authorizing the bond issue which made this building possible. It was fitting that he should lay the cornerstone of this building as he did on December 4, 1931. The Governors of the State of New York have almost without exception evinced genuine interest in public education. After having studied at some length the history of education in this State and the relations of all of the Governors to education, I find that some executives in earlier days gave more space to education in their official messages to the Legislature than Governor Smith did; but no Governor in our entire history in my judgment—and I say this advisedly—followed his declarations about education with fuller performance or was more whole-heartedly and practically the friend and safeguard of public education in all its forms in this State than Alfred E. Smith. I am indeed proud to be for the moment the agent of the State in giving this building into the custody of ex-Governor Smith and his associates on the Board of Trustees of this College.

### **Roosevelt's Interest Big Factor**

The State's interest in this College passed into other friendly hands when Franklin D. Roosevelt became Governor. It was he who signed the measure in 1930 appropriating \$600,000 from the bond issue for the erection of this building and who later included in the budget items for its equipment. His informed and enthusiastic interest in forest science has been an inspiration to this faculty and the land utilization program which he has urged has been a challenge to its scientific endeavor.

ors. We thus dedicate this building today with the keen personal interest of these two distinguished ex-Governors of the State invested in it. That is an asset which makes this occasion doubly noteworthy.

We dedicate this building also to all those who labored for the development of this College who are no longer with us; Dean Moon, and others of the faculty who gave it many years of faithful service; Chancellor Day, militant advocate of worthy causes; and Louis Marshall, whose name it bears, lawyer, statesman, public servant.

Finally, it must not be forgotten that this College could hardly have come to its present high estate and this building could hardly have been possible without the constant cooperation and support of Syracuse University. As head of Syracuse University and as a member of the Board of Trustees of this College, Chancellor Flint has stood on the firing line throughout his administration in behalf of this College. Mr. Chairman, as the representative of the State I give this Louis Marshall Memorial Building into the custody of the Board of Trustees of this College and into the care and wise counsel of the Chancellor of Syracuse University.

## ACCEPTANCE OF LOUIS MARSHALL MEMORIAL FOR THE COLLEGE OF FORESTRY

By Justice Edmund H. Lewis, Member of the Board of  
Trustees of the College

I THINK it is perfectly clear, after listening to this very interesting address by Dr. Horner, that we are today passing another milestone, and I use the word "milestone" in the sense of its being simply a punctuation point in progress, that is assuming we are going forward, and I believe after listening today to this most delightful talk that we can truly say that forestry in the state of New York is going forward.

A milestone testifies to distance traveled, to difficulties overcome, to victories won, and standing today as we do at this milestone a great many of us here are looking back with a good deal of sentiment to the association, to the fellowship, which we had with the Honorable Louis Marshall, whose life and whose work are emphasized by this building.

Born with outstanding native ability, made of that stuff that life and its experiences very soon hammered into leadership; leadership in his profession, leadership in the broad field of welfare work, and most of all, that with which we are most concerned at this present time, leadership in forestry.

I remember so well the first meeting it was my privilege to attend as a member of the Board of Trustees. Mr. Marshall then had in his heart the conception of this building, and you and I who knew him well, knew that when he had anything in his heart he at once set his mind to work upon it; and we who knew him also knew that when he set his mind to work upon that which was in his heart he got action. And so it was that action came from that conception which he had quite a number of years ago of this building which we are dedicating today, and he had as his assistant that strong supporter, Dean Franklin Moon, who with characteristic loyalty and with willingness of purpose furnished data and constant help to Mr. Marshall in his efforts toward this building.

And so it is fitting, it seems to me, that the life and the work of these two men for this College of Forestry should be emphasized by this building; two men with clear vision, two men who had the welfare of this College uppermost in their lives. This is not an old college as we think of old colleges. We have no ivy, at least I have not seen any, but we already have tradition and I believe it can be fairly said that these traditions involve the lives, among others, of Louis Marshall and Dean Franklin Moon.

We have been talking about milestones. Let us not confuse it with mill-stones. There is a good deal of mill-stone talk these days. But let us realize that this institution which has been provided for us, that by its provision we have fallen on great good fortune which means that

the influence of this College of Forestry in the State of New York and Syracuse University can be extended.

I like to think of this College of Forestry as a nerve center for forestry as a science and I suppose technically that as a nerve center it is also a brain center. I like to think of it as a nerve center from which go out impulsive acts across the length and breadth of this land to every man who is practicing forestry, or who is studying forestry, or who is even thinking of forestry, and in accepting this structure on behalf of the Board of Trustees of this College, with its unparalleled facilities, with its unparalleled equipment, as I believe it to be a fact, I realize that a trust is imposed upon the board, upon the faculty and upon the student body to see to it that this building is put to its best use.

Dr. Horner, speaking to you as a representative of the people of the State of New York at this time and accepting this building as I do on behalf of the Board of Trustees of this College, I pledge you that the efforts of the board, of the faculty and not alone of this student body of the year 1933 but all the student bodies for years to come will be ready to put this building to its highest use in the best interests of forestry as a science, in this state and in the nation.

## RESPONSE FOR THE FAMILY OF LOUIS MARSHALL

By James Marshall

IT was some 80 years ago that my grandfather literally dug his way up the Erie Canal and settled here in the City of Syracuse. Some 75-6 years ago my father was born here; here in Syracuse he went to School, here he commenced his law practice, here he learned his great devotion to the great institutions of our country, and here begot his great passion for public service.

Even after he left the city, Syracuse remained deeply imbedded in his heart and we used to tell him that a newsboy of Syracuse, or a street car conductor or an undergraduate of Syracuse University had easier entree into his office than a United States Senator or a foreign potentate.

Looking over some letters of his recently I learned it was here in Syracuse also that he got his first great interest in the forests and in conservation, because he wrote in one of those letters that it was while working in his father's store, handling furs he first got his interest in fur-bearing animals and that through this work he became interested in their habitats, and thus became interested in the forests. So, really one could almost say, it is to the common skunk and the humble ground-hog that he could be grateful for his inspiration in matters of conservation.

Later on he led the fight in the Consitutional Convention of '94 to read the conservation articles into the State Constitution, and still later he worked with all his might to create this College of Forestry here in the city of Syracuse.



## ACCEPTANCE OF LOUIS MARSHALL MEMORIAL FOR SYRACUSE UNIVERSITY

By Charles W. Flint, Chancellor of Syracuse University

A UNIVERSITY is a means to an end, a response to a demand. True it extends and intensifies that which created it, but fundamentally it is a supply responding to demand.

In the upward thrust of progressive creation, a creature finally appeared who wanted to know what it was all about. Not content with merely being assigned as a link in the chain of developments, he had an insatiable desire to know. The Hebrew dramatist pictured this trait as so overpowering that it refused to let even one tree in the grove of knowledge be taboo. (I suppose the dire results of that provocative prohibition marked the failure of the first noble experiment).

Universities were inevitable; they were inherent in creation. Charters may appear to come from Albany, but the original embryo of human nature contained all the charters of all institutions of learning.

Partially answered, yet ever unanswered, the questions, What? Whence? Why? Whither?, have compelled the organization of means to their end,—institutions of learning, higher institutions of learning, still higher and higher and higher institutions of learning.

What are universities for?

After milleniums of development, now centuries ago, the scholars of the Classical age delineated the purpose of education as a search for the True, the Beautiful and the Good.

### Search for Truth Extensive

Today we are quite proud of the remarkable progress we have made in the search for the True, the "What" of life. In range of fields explored, we have gone so far that we egotistically wonder if there is much more world to be conquered! In techniques for seeking truth, we are proud of the rapid strides made, yet humbled by the still baffling challenges along the foggy frontiers of knowledge.

What a story of achievement, of adapting means to ends, does merely the most recent period of universities unfold!

First and foremost is the finer accuracy and clearer insight of the scientific method, and during the last half-century the discovery and exploration of new field after new field by this penetrating instrumentality,—first, the physical sciences and their rapid subdivision and differentiation, then the social sciences and their increasing emergence into separate fields, now the field of mind, consciousness and personality, and—dare we prophesy—before us the, as yet, vaguely known and unexplored areas of the spiritual.

Important also are the lesser practical techniques of the past decade: physical and health education, physical training and sports, moulding the sound body to serve the sane mind;

the more intelligent discernment of abilities and the routing of differing individuals along different educational lines involved in "selective admission", and "guidance";

individualizing of instruction, adapting the menu of truth, the curriculum, to the appetites and needs of each student, with a scientific balancing of rigid prescription and liberal election, of concentration and distribution, of analytical thoroughness and specific skills, with synthesizing vision and integrating over-views which save from "piecemealishness" and give the meaning of the whole to every part;

personalizing of "instruction" into a sense of collegueship in the eager and independent search for truth, making examinations joint self-appraisals instead of artificial competitions between master and pupil.

Our pride in these and other achievements in the search for the True, is tempered considerably, however, when we appraise our progress in the search for the other two of the classic divisions of the fields of knowledge.

### **Search for the Beautiful Difficult**

Higher education seeks the Beautiful as well as the True. Not as successfully as yet; the techniques are less clear, indeed are somewhat baffling. More significant has been our accomplishment in providing for those of talent, in the practical phases of Fine Arts, than in techniques for creating, eliciting and developing the power of appreciation.

In our own College of Fine Arts, the first in America to give a four-year course leading to a degree, we have through the years successfully crossed the Beautiful and the useful and, as a technical or professional school, it is among the foremost.

But one of the two greatest problems challenging the attention of higher educational circles today is how to spread the Gospel of Beauty among the masses, to permeate a whole student body with the spirit and power of appreciation.

The intellectual and the aesthetic are not separate compartments of life but are inextricably interrelated in an undivided personality, and the output of higher education has been deformed by this disproportion in development.

I suppose "appreciation of art" somewhat resembles "culture" and "character" in that all are by-products of the educational process, not to be attained so much by special courses directed toward these ends as such, but realized as deposits from the direct processes, yet surpassing in value all the direct objectives and achievements.

### **Search for Good Is the Most Difficult**

That is why our progress in the search for the Good in the complete educational program is also far from gratifying. It lags far behind achievements in the search for the True and the practical application of the results, and also far behind attainments in the search for Beauty.

Direct service of the Good is the most baffling of all. To our inability as yet fully to comprehend its content and its processes must be added

inhibitions created by sectarianism and prejudices generated by dogmatism. But the greater the difficulty the greater the challenge.

The educational world at large has during the past ten years faced this more courageously and intelligently than during many preceding decades, and made more progress than in many other decades combined.

But it remains, the other of the two outstanding problems of higher education of the next ten years. The Good, as well as the Beautiful, must come in to its own. Techniques for aesthetic appreciation and for character development must be devised and applied. The two are in a sense one, and world progress lags, awaiting mastery of these and their enhanced service. We cannot go much further without the finer things of the soul finding their place in the sun.

So, of old, they summarized the purpose of education, therefore of a university, as the search for the True, the Beautiful and the Good.

### **American Version Includes Usefulness**

To this trilogy, an American revised version has added the "Useful", and, for us, education is the search for the True, the Beautiful, the Good and the Useful. Progress in the latter is one of the glories of American education. True there are eyes that refuse to see the glory of it. To some, it is still coarse adulteration, if not perversion, of the Great Quest. Opposition to technical and professional schools, bitter and persistent, has been born in some by devotion to unalloyed ideals of the True, the Beautiful and the Good for their own sake, in others to apprehension at the threat of rivalry to their guild.

But the charter of the Useful was also inherent in life's first embryo. The old Hebrew author was not merely a dramatist; he was a philosopher, a seer, a discernor of what is, when in the very process of creation, he depicted man as commissioner to "have dominion over every living thing that moveth upon the face of the earth."

The desire to master is as original as the desire to know.

For better, for worse, America has spoken. For her, the search is for the True, the Beautiful, the Good and the Useful. The college has become the university. Each new division has come up through great tribulation, but it has come up.

Accept it or not, exult in it or not, regret it or not, America has achieved some of her greatest triumphs in the search for the Useful, in the practical application of the True as apprehended, in harnessing knowledge to the service of mankind.

### **Truth and Usefulness Keep Pace**

Our technical and professional schools keep close on the heels of our most rapid advances in knowledge. The most recent discovery in the realm of Truth is worked over in their laboratories of practicality and service before it is allowed to get cold. We may well be proud of ourselves in this field. And why be apologetic or ashamed, as if practicality should be taboo, resourcefulness be regarded as plebeian, and service as beneath the dignity of the caste of seekers after truth?

Culture is not a primary or direct object of endeavor. Rather is it a by-product of the search for Truth and the application of the discoveries, and may be a by-product of the intersphered process of making the True to be also the Useful, as it may be of the pursuit of "truth for truth's sake". Indeed the hope for general culture as contrasted with an esoteric cult is in the former more than in the latter.

Granted success has not as yet been as great as might have been, as may be, as must be, yet there are encouraging signs of a drift in the direction of culturalizing our technical and professional education without destroying, nay even enhancing its serviceability.

The next ten years in higher education will see, I believe, still further and much more rapid development of this organic union of Truth and Usefulness.

### **Forestry Emphasises the Useful**

All this locates our New York State College of Forestry in its setting. It is one, indeed, the largest of its kind, of the professional colleges which cluster together to form a modern university.

Its specific task is the search for the Useful, but as an integral part of the larger search for the True, the Beautiful, the Good and the Useful; for Truth, Beauty, Goodness and Usefulness are inseparably one. Only in language can we distinguish or divide. Education cannot confine itself to one phase of the single search; each can be pursued only in relation to all.

The College of Forestry has as its peculiar assignment, emphasis on the Useful in a particular field of knowledge and service.

Its immediate practical objectives will be three-fold.

First is the effort to apply pertinent knowledge to forest production, silviculture, forest management, everything which aims to produce the best possible forest, trees and shrubs, birds, rodents, animals and fishes.

Second is the application of knowledge and skill to the development of forest products, the practical use of materials from the forest, or forest-drops, lumber and paper, fur and fish, etc.

The third objective is public service and public welfare in the conservation and distribution of water supply, in recreational facilities and the service of park engineering.

These three phases of forestry tend to differentiate foresters into various "brands" or types, as in engineering.

### **Forestry Education Must Be Broad**

While these are in the main "skills", yet skills without knowledge are wasteful guesses. Forestry is a science as well as an art. Knowledge of plant life and the conditions of its development makes the sciences of botany, zoology, chemistry, physics and geology, both in their fundamental and in their specialized forms, indispensable bases on which the practical must rest, nay, out of which it must grow, and in which it cannot cease to be rooted. Yet more, forests are, in a sense, social organizations, not mere aggregations of parts, but parts in relation, so a knowledge of this total "community" and the factors governing its



peculiar "community life" is necessary knowledge not only of plants, but of animal life incident to it, the normal members of the forest family, also the alien and destructive invaders, parasites such as insects and fungi.

The base of a College of Forestry must be broader still. All must be related to and intertwined with the pursuit of the True, the Beautiful, the Good and the Useful, in the inseparable unity of the Single Search.

The inextricable blending of sphere of knowledge into sphere of knowledge is well illustrated in the question now before forestry education,—Are not the social sciences also basic sciences for forestry education? Further development in forestry will be significantly dependent on research in the social sciences, notably in economics, including such fields as forest taxation and land utilization. The task of many foresters will call for a practical mastery of political science; others will find sociological problems looming large on their horizons.

### **Idealism Part of Forestry**

Wholly apart from the utility of the social sciences, foresters are men and citizens. Our graduates are granted a Baccalaureate degree, testifying not merely to skill, but also to knowledge, and still further to culture. They are college men; they are university men, with a wide range of awareness and interest, a breadth of vision and acquaintance back of a focused speciality and particular mastery.

As Dean Bray, the educational "daddy" of this particular college, has pointed out, the profession was born out of idealism.

"Fernow, the father of American forestry, was a practical idealist as were in a less marked degree Roth and Rothrock. To the materialistic mind of the politician of the early 90's, Fernow was an impractical dreamer. It took the socially awakened, cultured Roosevelt, with his idealism reinforced by political aptitude and a 'big stick' to arouse the national conscience on the one hand, and on the other to get specific legislative action, such as the setting aside of the forest reserves.

"The recruiting of a corps of men for the administration of these reserves in harmony with objectives then in view led to the first call for volunteers by Pinchot, which call was for college men, and by 'college men' were meant especially graduates of Liberal Arts Colleges like Harvard, Yale, Princeton, Amherst, and the State Universities; though, of course, it at once recognized that additional special training for the task was imperative. Yale early undertook to do this by superimposing the 'forestry' training on a Baccalaureate foundation."

American forestry education must remain true to its birth and keep the due proportion in emphasis and relationship between the broad and cultural base and the practical or professional skills.

Even at the expense of a fifth year, or of summers integrated into the regular course, the opportunity for the "fundamentals" of any and every higher education, of any and every Baccalaureate degree, must be freely afforded.



## Building to Serve Science and Culture

This building today is offered, accepted and dedicated to the cause of higher education and to the welfare of New York State.

Specifically it is a means of service to those practical phases of forestry, forest management, forest products and public service, but in order that these may be effective, it is as truly a means of service of the basic sciences and of the more basic culture.

Yet more, it is to be the physical home of a real college, throbbing with intellectual vigor, balanced and full-orbed.

The greatest single feature will therefore be, not its teaching and practice, though these are the fruits by which the masses will appraise it, but rather that "essential vitamin" not recognized or appreciated perhaps by the masses, that academic leaven which alone can vitalize and fructify teaching and practice,—the insatiable thirst for more knowledge, more understanding, more mastery, that inbreathed urge to brook no frontiers, to leave no territory unexplored, to have dominion, to leave no life or movement unmastered.

Quite appropriately the charter of this College provides:

"The carrying on and promotion of investigations, experiments and research in forestry and its several branches in field and forest, class room and laboratory and in industrial and commercial plants, also like investigations, experiments and research in relation to the habits, life histories, methods of propagation and management of fish, birds, game, food and fur-bearing animals and forest wild life."

Call it "Detecting and solving problems", call it "research", call it "extending the boundaries of systematic knowledge", call it "graduate work", call it "creative work", it is as much a part of this or any college as is breath of the body. It is this which gives vitality to all the activities of the organization. Without it all teaching becomes dry, flat and lifeless, lacking inspiration. With it teaching has freshness, sparkle, glow and charm.

Undergraduate and graduate work are complementary and inseparable. They are of one indivisible organism. The twilight zone between them embraces nearly all of each. The researcher needs his apprentices, his intellectual godchildren to stimulate him to his best and assist in its attainment. No man can teach successfully who does not keep alive in himself the divine fire which makes him ever seek knowledge, more and more, and mastery, higher and higher.

Moreover, nothing could be more practical. Success in practical forestation, reforestation, utilization of products, and in making the forest serve public welfare, is directly dependent on the problem-solving of research in laboratory and forest.

## **College Proud of Record**

Under limitation of finance, space, staff and equipment, the New York State College of Forestry at Syracuse University is proud of the rather remarkable record of research in these early years of its existence.

And what is before it? In forest botany, forest chemistry, forest zoology, in wild life as much a part of the forest as cattle or poultry are of the farm, in silviculture, forest management, in forest utilization and forest products, in recreational forestry-problems, numerous and acute, are challenging the best skill and all the energy of the staff. New York State's welfare in several significant and practical directions awaits their solution.

These admirable laboratories so generously provided by the State impose as new obligation. Supplemented by the 14,000 acres of the Huntington Wild Life Forest, by the 2,200 acres of the Charles Lathrop Pack Demonstration Forest, the over 1,000 acres of the Pack Experimental Forest and other forest lands, they are a sharp but welcomed challenge to this College and its affiliated University.

## **Appropriately Dedicated to Marshall**

Many memorials would be fitting to the life of Louis Marshall; a law building or professorship or library would have memorialized his remarkable legal genius, his leadership and mastership in his chosen phases of his profession.

A college, a university foundation, a general library, a professorship, fellowships, would be a natural tribute to his intellectual acumen, wide range of reading, his extensive and inclusive culture.

A synagogue, a theological seminary, a temple of universal religion, would appropriately recall the spiritual depths of a reverent soul, the sacred loyalties of his inner life and outward associations, the broad sympathies and tolerance of his spirit of true brotherhood.

A social service institute, a legal service bureau, would perpetuate the passion for humanity, especially for the oppressed, which ever suffuses his memory with a glow of glory.

But New York State most appropriately memorializes her great citizen in that sphere of his interest which made him a forester by avocation, and most appropriately also in this College, for whose origin he had so large a share of the responsibility, over whose initial development he presided as President of its Board for its first eighteen years, in this College connected with a University which he loved and served without stint as trustee and benefactor.

To the memory of one of New York State's greatest citizens, and to the service of future generations of citizens of New York State, this building is now dedicated and henceforth devoted.

## PRESIDENT BAKER RECEIVES DEGREE

At the close of the dedicatory addresses Chancellor Flint led a special convocation of the University for the purpose of conferring an honorary degree of L.L.D. upon Dr. Hugh P. Baker. Dr. William L. Bray proposed the degree and Chancellor Flint conferred it with the following citation:

"Hugh Potter Baker, Bachelor of Science of Michigan State College, Master of Forestry of Yale University, Doctor of Economics of the University of Munich; minister to public welfare in the National Forest Service; teacher of forestry in the higher educational institutions of three great states; executive officer of an important national industry; department-manager in the Chamber of Commerce of the United States; Dean and builder of an educational institution; President of the State College of one of our greatest commonwealths; in recognition of your faithfulness, devotion and skill in these spheres, and more particularly of that peculiar administrative genius which is stamped indelibly upon the records of the New York State College of Forestry at Syracuse University, I do now confer upon you the degree of Doctor of Laws and invest you with all the rights and privileges appertaining to that degree."

## ACADEMIC FORMALITY OBSERVED

Formality marked the dedication. The academic procession which marched into the auditorium was headed by two official marshals appointed for the occasion. Dr. Charles J. Kullmer of the University and Dr. Harry P. Brown of the College of Forestry. Then appeared in the following order: Charles W. Flint, Chancellor of Syracuse University; Samuel N. Spring, Dean of the College of Forestry; George Bond, Regent of the University of the State of New York, Dr. Harlan H. Horner, Assistant Commissioner for Higher Education, State of New York; Dr. William H. Powers, Dean of the Chapel, Syracuse University; Dr. William P. Graham, Vice Chancellor, Syracuse University; James and Robert Marshall, sons of Louis Marshall; Dr. Hugh P. Baker, President of Massachusetts State College; Dr. William L. Bary, Dean of the Graduate School, Syracuse University; the Trustees of the College of Forestry, Deans of the University, special guests and heads of the departments of the College of Forestry. The academic procession formed at 1:45 P. M. in room 122 on the ground floor which was set aside as the robing room. The procession marched into the auditorium, proceeded down the right aisle and occupied seats on the stage.

A buffet luncheon was served for 200 invited guests in the museum room of the new building. The evening program was featured by the annual Forestry Club banquet for which 500 places were set in the grand ballroom of the Syracuse Hotel and a dinner for fifty ladies of the faculty and visiting ladies in a private dining room of the hotel.

## Visitors Who Registered at the Louis Marshall Memorial Dedication

Alton Adams, Iroquois Farm Forester, R. D. No. 4, Cooperstown, N. Y.  
 Henry R. Adams, Syracuse University, Syracuse, N. Y.  
 Dorothy E. Allen, Lyman Hall, Syracuse University.  
 Leon S. Allyn, 67 Park Ave., Rochester, N. Y.  
 H. G. Anderson, 971 Lancaster Ave., Syracuse, N. Y.  
 N. K. Archbold, 805 Walnut Ave., Syracuse, N. Y.  
 Hugh P. Baker, Massachusetts State College, Amherst, Mass.  
 Mrs. Hugh P. Baker, President House, Amherst, Mass.  
 Arthur J. Barry, 210 Walnut Pl., Syracuse, N. Y.  
 C. Edward Behre, N. E. Forest Exp. Station, New Haven, Conn.  
 George E. Bennett, College of Business Administration, Syracuse University.  
 Hubert E. Bice, Syracuse University—Slocum Hall.  
 Nancy S. Bice, 1040 Westmoreland Ave., Syracuse, N. Y.  
 F. J. Bierce, Nottingham School, Syracuse, N. Y.  
 Margaret H. Boehner, Syracuse University.  
 R. S. Boehner, 305 Comstock Ave., Syracuse, N. Y.  
 Geo. H. Bond, Regents, Education Dept., Albany, N. Y.  
 Carolyn E. Boyson, 216 Lyman Hall, Syracuse University.  
 William L. Bray, 209 Lyman Hall, Syracuse University.  
 Ella W. Brewer, 965 Livingston Ave., Syracuse, N. Y.  
 Robert K. Brewer, Syracuse University, Medical College.  
 M. Bryant, Syracuse University.  
 Mrs. H. D. Buell, 314 Euclid Ave., Syracuse, N. Y.  
 Curtis C. Bushnell, Box 51, University P. O. Syracuse, N. Y.  
 Charles L. Button, Finger Lakes State Parks, Watkins Glen, N. Y.  
 Floyd M. Callward, St. Lawrence University, Canton, N. Y.  
 Bernard T. Campbell, 820 Madison St., Syracuse, N. Y.  
 Mrs. H. B. Campbell, 820 Madison St., Syracuse, N. Y.  
 William L. Chapel, Dept. of Forestry, Cornell University, Ithaca, N. Y.  
 John C. Clark, 506 S. Crouse Ave., Syracuse, N. Y.  
 H. D. Cornwall, Utica, N. Y.  
 W. Louise Cracker, 216 Lyman Hall, Syracuse University.  
 F. G. Crawford, Syracuse University.  
 Mrs. F. G. Crawford, 716 Sumner Ave., Syracuse, N. Y.  
 George H. Cressey, Dept. of Geology and Geography, Syracuse University.  
 M. C. Cross, 105 Slocum Hall, Syracuse University.  
 Ruth Davey, Wilkes-Barre, Pa.  
 William J. Davison, Syracuse University.  
 J. Devine, Canastota, N. Y.  
 Henry C. Dexter, Black River, N. Y.  
 James F. Dubuar, N. Y. State Ranger School, Wanakena, N. Y.  
 Albert L. Elder, Syracuse University.  
 W. J. Endersbee, Pulaski, N. Y.  
 Mildred E. Faust, 216 Lyman Hall, Syracuse University.  
 Chancellor Chas. W. Flint, Syracuse University.  
 Mrs. C. W. Flint, 701 Walnut Ave., Syracuse, N. Y.  
 Charles E. Foley, Waterloo High School, Waterloo, N. Y.  
 S. Frensdorf, Syracuse, N. Y.  
 William L. Fryer, 127 Madison St., Syracuse, N. Y.  
 Louis Gassell, 318 Renwick Ave., Syracuse, N. Y.  
 John R. Giddings, 9 S. Broadway, White Plains, N. Y.  
 Norman J. Gillette, 216 Lyman Hall, Syracuse University.  
 Alvin L. Gilmore, 445 S. Warren St., Syracuse, N. Y.  
 W. P. Graham, 1205 Harrison St., Syracuse, N. Y.—Syracuse University.  
 Mrs. W. P. Graham, 1205 Harrison St., Syracuse, N. Y.  
 Ralph J. Gregg, Syracuse University.  
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 Carl E. Haischer, Raquette Lake, N. Y.  
 W. S. Halsey, Oriskany Falls, N. Y.  
 Marjorie B. Hand, 297 Rye Beach Ave., Rye, N. Y.  
 J. W. Hansen, Syracuse University—Business Administration.  
 Mrs. Edwin S. Harris, 501 Allen St., Syracuse, N. Y.  
 Mrs. L. E. Harrison, West Winfield, N. Y.  
 Charles W. Henderson, College of Applied Science, Syracuse University.  
 Mrs. Chas. W. Henderson, DeWitt, N. Y.  
 Edward H. Henry, Tully, N. Y.  
 Paul A. Herbert, Michigan State College, East Lansing, Mich.  
 Harold E. Hersher, Jamesville, N. Y., R. D. No. 1.  
 Louis F. Hills, 253 Greenwood St., Syracuse, N. Y.  
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 Harlan H. Horner, State Education Dept., Albany, N. Y.  
 Ralph S. Hosmer, Dept. of Forestry, Cornell University, Ithaca, N. Y.  
 Leon M. Howe, Syracuse University.  
 Morton Hurwitz, 662 Madison St., Syracuse, N. Y.  
 George M. Hyman, c/o Jewish Communal Center, 222 Cedar St., Syracuse, N. Y.  
 Ray Freeman Jenney, 116 Concord Pl., Syracuse, N. Y.  
 Mr. and Mrs. Burges Johnson, Syracuse University.  
 Henry N. Jones, 859 Lancaster Ave.,—12 Lyman Hall, Syracuse University.  
 Lillie C. Kinney, 634 S. Crouse Ave., Syracuse, N. Y.  
 Ezra F. Knapp, Prescott School, Syracuse, N. Y.  
 L. F. Kneipp, U. S. Forest Service, Washington, D. C.  
 William S. Knickerbocker, Sewanee, Tennessee.  
 Jack R. Lamphere, 731 Schuyler St., Syracuse, N. Y.  
 Edgar Lanphear, Raquette Lake, N. Y.  
 O. L. Latham, Wanakena, N. Y.—N. Y. State Ranger School.  
 K. C. Leebrick, Syracuse University.  
 Beryl F. Leebrick (Mrs.) 216 Salt Springs St., Fayetteville, N. Y.  
 Mrs. Marx H. Leopold (nee Ida Marshall), 1848 W. 17th St., Philadelphia, Pa.  
 Fred B. Malcolm, 215 W. Ostrander Ave., Syracuse, N. Y.  
 Clara C. Marsh, Syracuse, N. Y.  
 Bob Marshall, 2145 C. St., N. W., Washington, D. C.  
 Howard E. Marshall, Jr., Syracuse, N. Y.  
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 Prof. Neut W. Meyer, 39 W. 67th St., New York City.  
 Mr. and Mrs. Charles Milback, R. D. No. 4, E. Syracuse, N. Y.  
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 Emmeline Moore, Conservation Dept., Albany, N. Y.  
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 R. L. Nye, Syracuse University.  
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 Edward H. O'Hara, The Herald, Syracuse, N. Y.  
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 L. C. Petry, Ithaca, N. Y.  
 Wm. H. Powers, Syracuse University.  
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 Charles L. Prather, 106 Slocum Hall, Syracuse University.  
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Ernest Reed, Syracuse University.  
 Frederick W. Revles, Fine Arts College, Syracuse University.  
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 Mrs. Abram Rosenberg, Philadelphia, Pa.  
 Mrs. Charles R. Rosenthal, 17 Davis St., Binghamton, N. Y.  
 R. J. Ryan, Court House, Syracuse, N. Y.  
 Mrs. Anna Sahla, Brickeburg, Schawb Lippe, Germany.  
 Albert Salathe, Syracuse University, Syracuse, N. Y.  
 S. D. Sarason, Applied Science, Syracuse University.  
 Mrs. S. D. Sarason, Syracuse, N. Y.—834 Sumner Ave.  
 Henry Schmitz, University of Minnesota, St. Paul, Minn.  
 Paul J. Sedgwick, Botany Dept., Liberal Arts, Syracuse University.  
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 Geo. R. Tilford, 106 Slocum Hall, Syracuse University.  
 H. G. Weiskotten, Syracuse, N. Y.—Medical College.  
 Mrs. H. G. Weiskotten, Syracuse, N. Y.  
 Mrs. Herbert S. Wilcox, West Winfield, N. Y.  
 Ross A. Williams, N. Y. S. Ranger School, Wanakena, N. Y.  
 Mrs. Ross A. Williams, Wanakena, N. Y.  
 Christopher Wilson, Ithaca, N. Y.  
 Ellwood Wilson, Cornell University, Ithaca, N. Y.  
 Mrs. George A. Wilson, 1022 Lancaster Ave., Syracuse, N. Y.  
 K. M. Wujand, Cornell University, Ithaca, N. Y.  
 Glenna Wurth, Lyman Hall, Syracuse University.  
 Mrs. John L. Youmans, Syracuse, N. Y.  
 Jordan A. Zimmerman, University Bookstore, Syracuse, N. Y.  
 G. Robert Zink, 136 E. Genesee St., Syracuse, N. Y.











